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DESCRIPTION OF UNITS, SPECIFICATIONS, AND DRAWINGS FOR TRANSMISSION VOLTAGES LINE CONSTRUCTION

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PART I. DESCRIPTION OF CONSTRUCTION UNITS

(For Use in Preparing Contractor's Proposal)

The proposal is to be made on a unit basis so that the Engineer may specify any combination of construction units that he may deem necessary. The various construction units that are included in this Proposal, and upon which quotations are required, are defined by symbols and descriptions set forth in this part I. Separate assembly units are designated for each different arrangement which may be used in the construction of the Project. This Proposal is based on a consideration of each unit in place and includes only the materials listed on the corresponding Construction Drawings.

1. Pole Unit. Consists of one pole in place. It does not include pole-top assembly unit or other parts attached to the pole. The first two digits indicate the length of the pole; the third digit shows the classification per A.S.A. (Example: 45-3 means a pole 45 feet long, class 3.)

2. Pole-top Assembly Unit. Consists of the hardware, crossarms and their appurtenances, insulators, etc., except tie wire, required to support the power conductors and overhead ground wire. It does not include the pole, the downlead, and butt coil, which are separate units.

3. Guy Assembly Unit. Consists of the hardware and wire. Guy guards are designated separately.

4. Anchor Assembly Unit. Consists of the anchor with rod or rods, complete, ready for attaching the guy wire.

5. Conductor and Overhead Ground-wire Assembly Unit. Consists of 1,000 feet of a single conductor or overhead ground wire, and includes tie wire, sleeves for splicing, and armor rods with clips or armor wire where necessary. The length of conductor or overhead ground wire shall be determined by taking the sum of all straight horizontal span distances between pole stakes or from center to center of the poles carrying the conductors. The conductor sizes listed are the manufacturer's designation.

6. Miscellaneous Assembly Unit. Consists of all additional units needed in the Project for line construction but not otherwise listed in the Proposal.

7. Substation Assembly Unit. Consists of the complete substation ready for connection of the line conductors, as shown on the substation drawing.

8. Right-of-way Clearing Units.

TM-12. The unit, for purpose of quoting, is 1000 feet in length and_____ (_____) feet in width (to be measured_____ (_____) feet on one side of pole line or centerline of structures) of actual clearing of right-of-way. This includes clearing of underbrush, tree removal, and such tree trimming as may be required to leave an unobstructed right-of-way from the ground up on one side of the line of poles carrying conductors. (See Detail A, Drawing TM-12-2A.)

The length of actual clearing shall be measured in a straight line parallel to the line between poles or centerline of structures and across the maximum dimension of foliage cleared (not trunk) projected to the ground line. (See Detail B, Drawing TM-12-2A.)

All trees and underbrush across the width of the right-of-way shall be considered to be grouped together as a single length in measuring the total length of clearing. (See Detail C, Drawing TM-12-2A.)

Spaces along the right-of-way in which no trees are to be removed or trimmed or underbrush cleared shall be omitted from the total measurement. All length thus arrived at, added together and divided by 1000, shall give the number of 1000-foot TM-12 units of clearing. The contractor shall not remove or trim shade, fruit, or ornamental trees unless so directed by the Engineer in writing.

TM-12 (1). This unit is identical with TM-12, except the full width of the right-of-way to be cleared shall be _____ (_____) feet wide (to be measured _____ (_____) feet on each side of the pole line or centerline of structures). (See Detail D, Drawing TM-12-2A.)

TM-13. The unit, for purpose of quoting, is 1000 feet in length of clearing off the right-of-way. This unit includes the removal or topping of danger trees at the option of the Contractor. Danger trees are considered to be those which will reach within five feet of a point underneath the outside conductor in falling. Such trees will be designated by the Engineer in writing. (See Drawing TM-12-2A.)

The measurement of length of right-of-way to be cleared shall be considered as a straight line parallel to the line between poles or centerline of structures, such measurement of length to be based on maximum dimension of foliage (not trunk) projected to the ground line. (See Details E, F, G, and H, Drawing TM-12-2A.)

Dead trees having no foliage shall be measured across the maximum dimension and multiplied by two. (See Detail F, Drawing TM-12-2A.) Each tree so removed shall be added together to determine the total length of clearing. All length thus arrived at, added together and divided by 1000, shall give the number of TM-13 units. (Example: Details E, F, G, and H, Drawing TM-12-2A, total .1 of a TM-13 unit.)

PART II. SPECIFICATIONS FOR CONSTRUCTION

1. General.

All construction work shall be done in a thorough and workmanlike manner in accordance with the Plans, Specifications, and Construction Drawings, and shall be subject to the acceptance of the Engineer and the Administrator.

Deviations from the Plans, Specifications, and Construction Drawings shall not be permitted except upon the written permission of the Engineer given with the approval of the Administrator.

2. Scope.

The Plans and Specifications cover the construction of a rural electrical transmission system known as Rural Electrification Project_____
_____

which consists approximately of the following:
_____
_____
_____
_____
_____
_____

The Project is located in the County or Counties of_____
_____
_____ State (s) of _____
All of the above is included within the terms of the Loan Contract.

3. Drawings and Maps.

The Vicinity Map showing the general route of the transmission line or lines, and showing sections of the line covered by each Plan and Profile sheet is listed separately hereinafter and is part of these Plans and Specifications and no deviation from the Plan and Profile drawings shall be made without the written approval of the Administrator. The Construction Drawings, including the Plan and Profile and structure lists, showing the type of construction to be used where indicated on the Plan and Profile, also are listed separately hereinafter and are part of these Plans and Specifications.

4. Locations of Structures.

Structures, guys, etc., shall be placed in locations determined by the engineer and staked by the engineer as shown on the Plan and Profile sheets and structure lists. Structures, guys, etc., shall not be erected in any other location without prior approval of the Engineer.

5. Wood Poles.

In distributing poles, extra heavy, choice, close-grained poles shall be reserved for angles, crossings, and dead ends.

For single pole structures the minimum setting depths shall be as follows:

Pole length (feet)	Setting depth (feet)
35	6.0
40	6.0
45	6.5
50	7.0
55	7.5
60	8.0
65	8.5
70	9.0
75	9.5

For multiple pole structures, holes shall be carefully dug to the setting depth specified by the Engineer, except that the distance from the butt to the gain shall be measured for each pole and the depth of holes adjusted as required. If necessary the top of one pole of a multiple pole structure shall be cut and reframed to bring crossarms level.

On sloping ground, the depth of the hole shall always be measured from the low side of the hole.

Holes shall be approximately 8 inches larger than the butt diameter of the pole, and shall be at least as large at the bottom as at the top.

All poles shall be set in alignment except on line angles, and plumb. At line angles, where suspension construction is used, poles shall be offset on the bisector of the angle so that conductors will hang directly over the point of intersection or in line with the tangent in both directions. All poles shall be plumb after conductors are strung.

In backfilling, holes shall be thoroughly tamped the full depth. Earth shall be banked up around each pole. After completion of the job, holes shall be inspected and any settlement refilled.

Where new gains or holes are required in fir, pine, and full-length treated cedar poles, the gains shall be painted with creosote compound and holes pressure treated with creosote compound using a pressure gun.

The tops of full length treated poles shall not be cut except under very exceptional conditions and upon approval of the Engineer. If cutting is deemed necessary, the pole top shall be painted with creosote compound and covered completely with a copper cap plate.

Under no circumstances shall the butt of any pole be cut.

All unused holes in poles shall be plugged prior to erection, using treated wood dowel pins. For holes in used poles where the hole has been enlarged, the hole will be pressure treated with creosote compound using a pressure gun prior to plugging.

6. Guys and Anchors.

Guys shall be installed in locations specified by the engineer. Points of attachment to poles shall be as shown on construction drawings. Guys shall be installed before conductors or overhead ground wires are strung.

Holes for anchor logs shall be dug in locations staked by the engineer. Anchor rods shall be in line with the strain and so installed that approximately 12 inches of the rod shall remain out of the ground. Under no circumstances shall the eye of the rod be covered. Holes shall be backfilled and tamped in the same manner as for pole holes. The setting of each anchor as regards depth and position shall be inspected by the Engineer and the Engineer's approval given in writing before the anchor hole shall be backfilled.

7. Insulators.

Care shall be exercised in handling and erecting insulators and in assembling suspension units to insure that all cotter keys are in place.

8. Conductors and Overhead Ground Wires.

Care shall be exercised to avoid kinking, twisting, or abrading the conductor or overhead ground wire in any manner. Conductors or overhead ground wires shall not

be tramped on, run over by vehicles, or dragged over sharp rocks. The wire on each reel shall be inspected for cuts, kinks, or other injuries. Injured portions or crooked or imperfect splices in either the conductor or overhead ground wire shall be cut out and the wire respliced.

Conductors and overhead ground wires shall be pulled over suitable rollers or stringing blocks properly mounted on the pole or crossarm, to prevent binding while stringing.

Installation of conductors and accessories shall be done in accordance with manufacturers' recommendations.

With pin-type insulators the conductors shall be tied in the top groove of the insulator on tangent poles and on the side of the insulator away from the strain at angles. Pin-type insulators shall be tight on the pins and on tangent construction the top groove must be in line with the conductor after tying in.

There shall not be more than one splice per conductor in any span, and no splice shall be located within 10 feet of the conductor support.

Utmost care shall be exercised in installing parallel groove clamps. The contact surface of the clamp and the wire shall be clean and bright. A steel brush shall be the principal cleaning medium. Bolts shall be brought down hard, but the threads must not be overstressed. These same precautions for cleaning also shall apply to the conductor before splicing.

Conductors and overhead ground wires shall be sagged in accordance with sag and tension charts or tables furnished by the Engineer. The sag of all conductors after stringing shall be in accordance with the Conductor Manufacturers' recommendations, except that a maximum increase of 3 inches of the specified sag in any span will be acceptable: Provided, however, that required clearances are obtained; under no circumstances will a decrease in the specified sag be allowed. Sagging by sighting between targets is recommended.

The air temperature at the time and place of stringing shall be determined by a certified etched-glass thermometer. The temperature at which the conductor is sagged in and the spans in which sags are measured shall be recorded and the information given to the Engineer.

9. Clearing Right-of-way and Danger Trees.

In preparing the right-of-way, trees shall be removed, underbrush cleared, and trees trimmed so that the right-of-way, except for tree stumps which shall not exceed _____ in height, shall be clear from the ground up and of the width specified in the Proposal and Construction Agreement. Trees fronting each side of the right-of-way shall be trimmed symmetrically unless otherwise directed by the Engineer. Dead trees beyond the right-of-way which would strike the line in falling shall be removed. Leaning trees beyond the right-of-way which would strike the line in falling and which would require topping if not removed may be removed or topped at the option of the Contractor except that the Contractor shall trim and not remove shade, fruit, or ornamental trees unless otherwise directed by the Engineer.

Trees that are felled shall be cut to commercial wood lengths, stacked neatly, and left on the right-of-way for the landowner. Commercial wood length means the length designated by the Engineer but in no case shall it be required to be less than _____ (_____) feet. Brush, branches, and refuse shall, without delay, be disposed of by such of the following methods as the Engineer will direct (Engineer to strike out methods not to be used):

a. Burned.

b. Removed from the vicinity of the right-of-way.

c. Piled on one side of the right-of-way in such a manner as not to obstruct roads, ditches, drains, etc.

_____ _____

(Engineer) (Date)

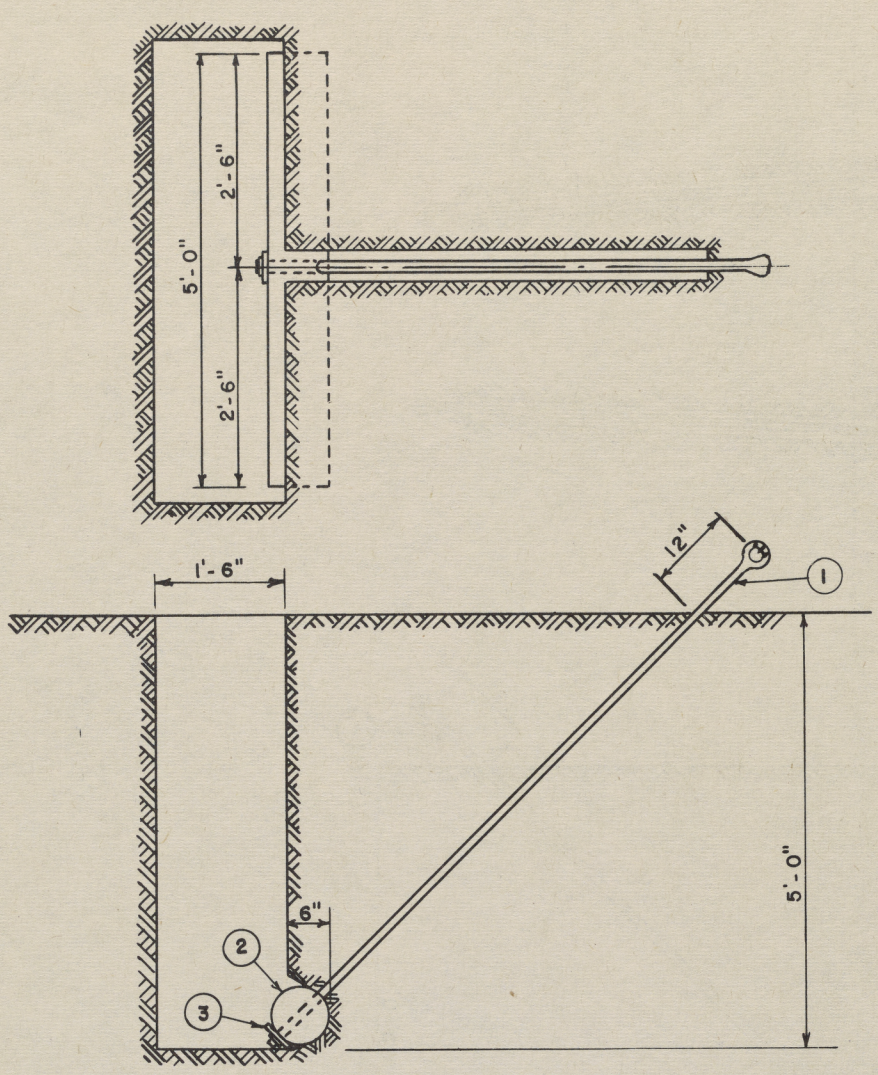
All right-of-way operations shall be carried out as directed by the Engineer in a manner to preserve symmetrical appearance in accordance with Construction Drawings.

10. Miscellaneous.

Sufficient safe, cool, drinking water and an adequate first-aid kit must be provided on each work truck. Adequate safety equipment and construction tools shall be provided by the contractor.

PART III. CONSTRUCTION DRAWINGS

The Construction Drawings for this Project are attached and follow.

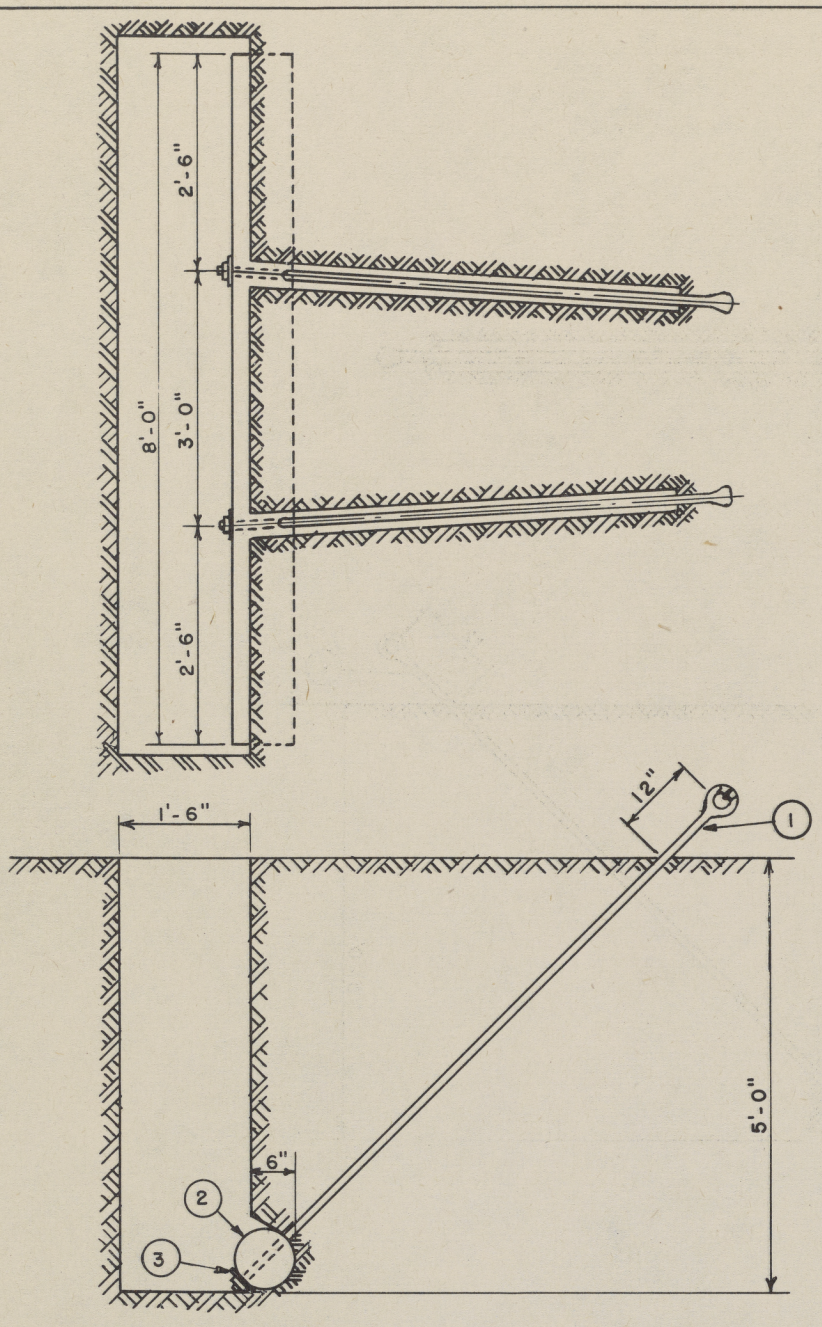


DR'G REF.	REQ'D	DESCRIPTION	ITEM	MAXIMUM WORKING LOADS
1	1	3/4"x 8'-0" Twin Eye Anchor Rod	x	8,000#
2	1	8"x 5'-0" Anchor Log	z	8,000#
3	1	4"x 4"x 1/2" Galv. Sq. Washer, 13/16" Hole	d	

TRANSMISSION LINE

SINGLE ROD LOG ANCHOR ASSEMBLY

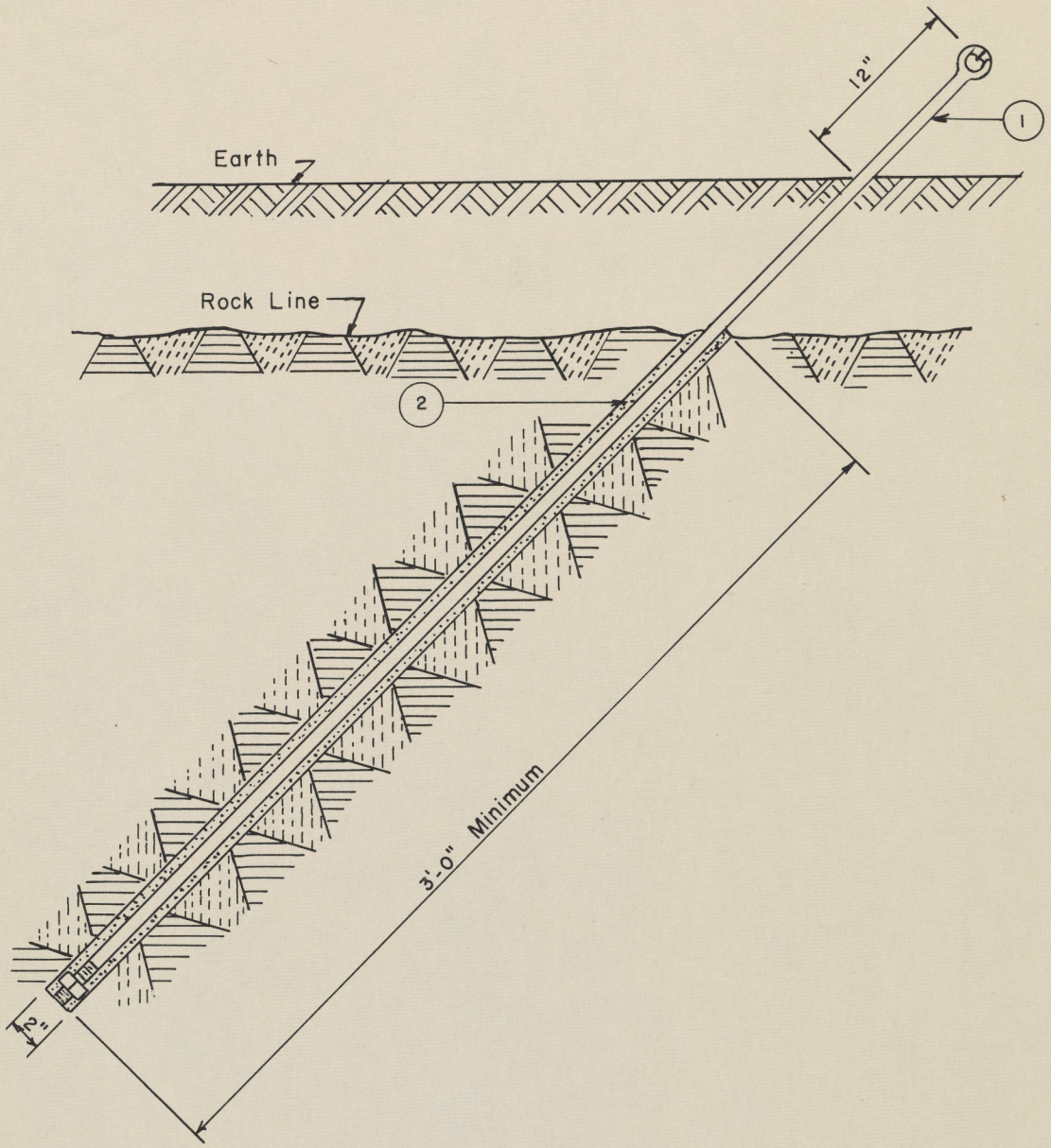
Scale: 1/2"=1'-0"		Date:
		TA-1-5



DR'G REF.	REQ'D	DESCRIPTION	ITEM	MAXIMUM WORKING LOADS
1	2	3/4"x8'-0" Twin Eye Anchor Rod	x	8,000 #
2	1	8"x8'-0" Anchor Log	z	16,000 #
3	2	4"x4"x1/2" Galv. Sq. Washer, 13/16" Hole	d	

TRANSMISSION LINE
TWO ROD LOG ANCHOR ASSEMBLY

Scale: 1/2"=1'-0"		Date:
		TA-1-8



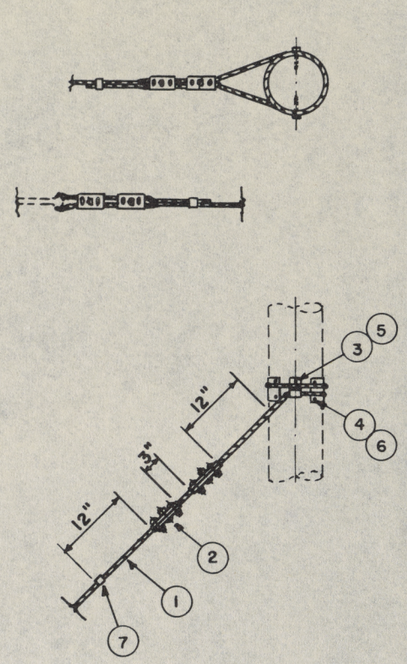
DR'G REF.	REQ'D	DESCRIPTION	ITEM	MAXIMUM WORKING LOAD
1	1	3/4"x 8'-0" Twin Eye Anchor Rod	x	8000#
2		Grout		

TRANSMISSION LINE
ROCK ANCHOR ASSEMBLY

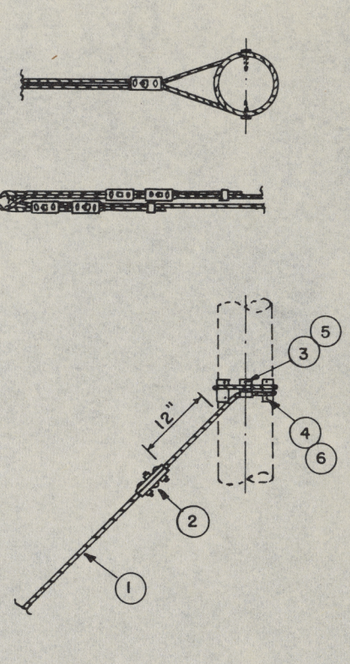
Scale: 1"=1'-0"

Date:

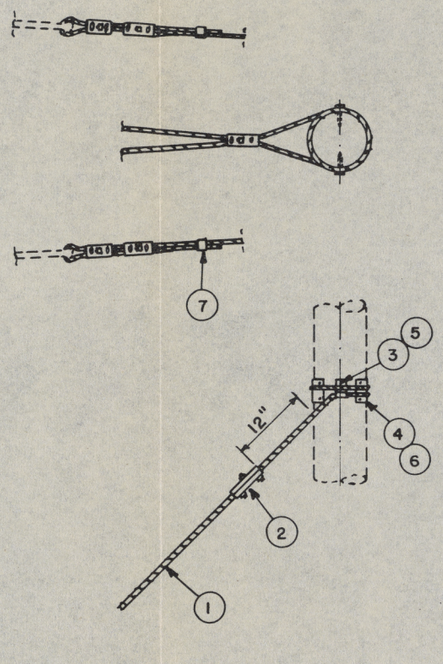
TA-2



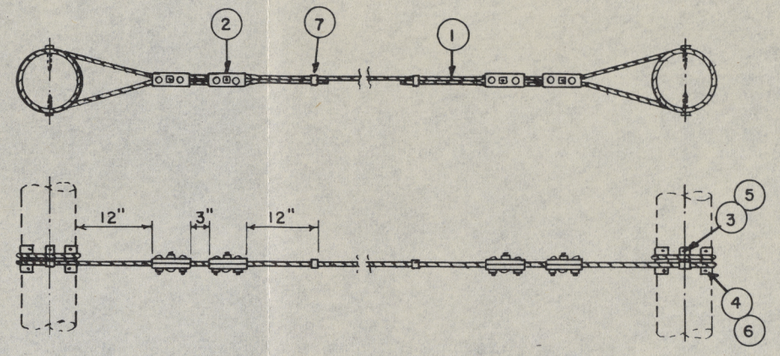
SINGLE GUY
TG-1



DOUBLE GUY TO ONE ROD
TG-2



DOUBLE GUY TO TWO RODS
TG-3



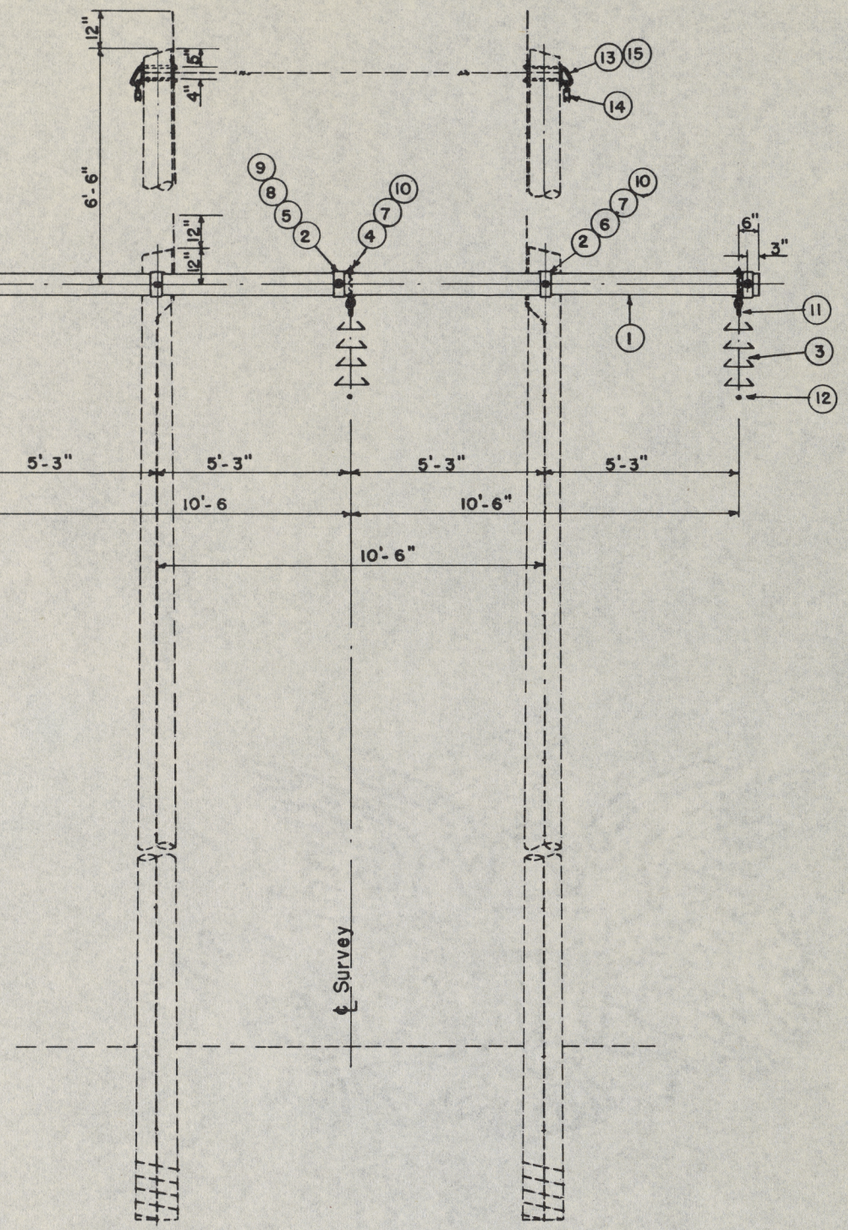
OVERHEAD GUY
TG-4

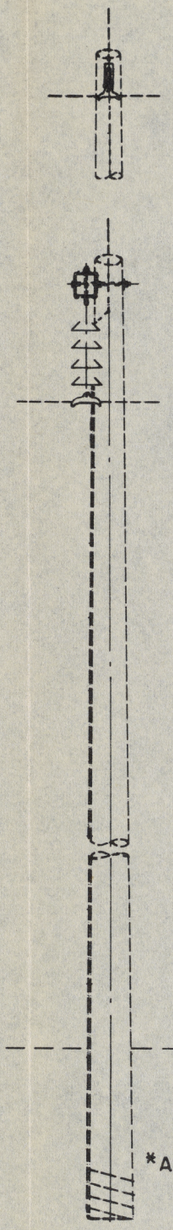
LIST OF MATERIAL

DR'G REF.	REQUIRED TG-1	TG-2	TG-3	TG-4	DESCRIPTION	ITEM
1	75'±	150'±	150'±	25'±	Guy Wire	y
2	4	5	5	4	3 Bolt Guy Clamp, 6" Long	u
3	2	2	2	4	Guy Hook	bj
4	2	2	2	4	Guy Plate	bk
5	2	2	2	4	1/2"x 4" Lag Screw	j
6	1/16#	1/16#	1/16#	1/8#	6d Copperweld Nails	bp
7	2	2	2	2	Guy Clip	dz

TRANSMISSION LINE GUY ASSEMBLIES

Scale: 1/2"=1'-0"		Date:
		TG-1,2,3,4





*As required. See Drg. TM-1

NOTE:

Make one turn of downlead underneath washer around overhead ground wire support bolts, and staple to pole so that it does not come in contact with crossarms or through bolts.

Designation without Overhead Ground is TH-1.

Designation with Overhead Ground is TH-1G.

LIST OF MATERIAL

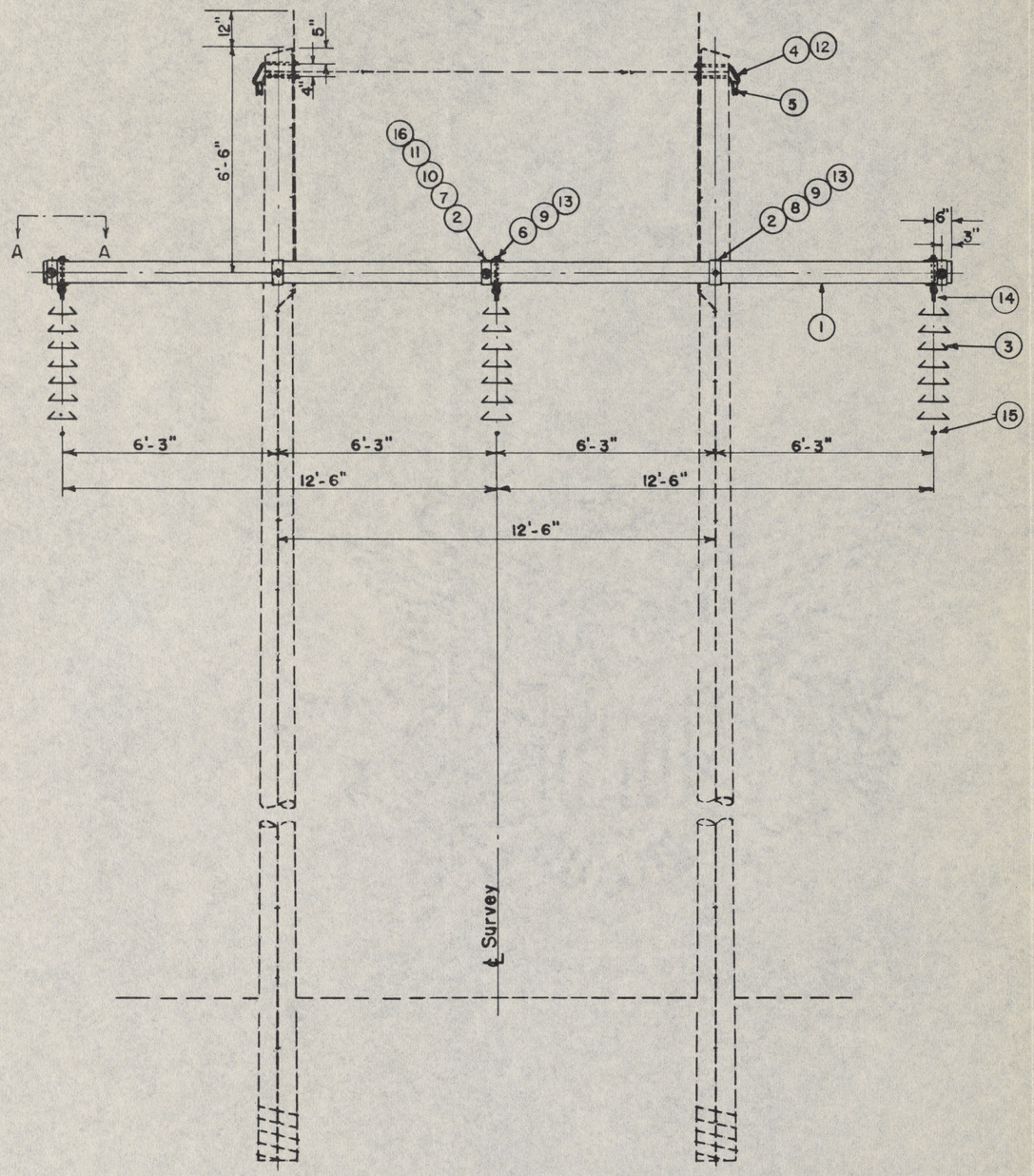
DR'G REF.	REQ'D	DESCRIPTION	ITEM
1	1	5¾"x7¾"x22'-0" Wood Crossarm	g
2	8	Reinforcing Plate for 8" Crossarm	eg
3	*	5 3/4"x10" Suspension Insulator	k
4	3	3/4"x10" Eye Bolt	o
5	3	1/2"x8" Machine Bolt	c
6	2	3/4"x18" Machine Bolt	c
7	8	4"x4"x3/16" Galv. Sq. Washer, 13/16" Hole	d
8	6	1 3/8" Galv. Round Washer, 9/16" Hole	d
9	3	Locknuts for 1/2" Bolt	ek
10	5	Locknuts for 3/4" Bolt	ek
11	3	Suspension Hook	eh
12	3	Suspension Clamp and Connecting Piece	ei
		ADDITIONAL MATERIAL FOR TH-1G	
13	2	Ground Wire Cable Support	ed
14	2	Ground Wire Suspension Clamp	m
15	4	Locknuts for 5/8" Bolt	ek

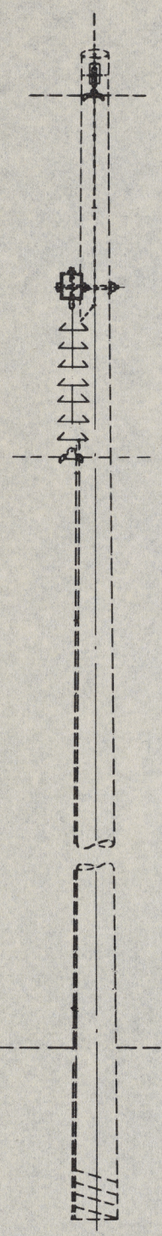
TRANSMISSION LINE TANGENT STRUCTURE
___KV. H-FRAME SUSPENSION - TWO POLE
(34.5 TO 69 KV.)

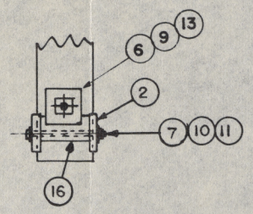
Scale: 1/4"=1'-0"

Date: 11-49

TH-1, TH-1G







SECTION "A-A"

LIST OF MATERIAL			
DRG. REF.	REQ'D	DESCRIPTION	ITEM
1	1	5¾"x7¾"x26'-0" Wood Crossarm	g
2	8	Reinforcing Plate for 8" Crossarm	eg
3	*	5 3/4"x10" Suspension Insulator	k
4	2	Ground Wire Cable Support	ed
5	2	Ground Wire Suspension Clamp	m
6	3	3/4"x10" Eye Bolt	o
7	3	1/2"x 8" Machine Bolt	c
8	2	3/4"x18" Machine Bolt	c
9	8	4"x4"x 3/16" Galv. Sq. Washer, 13/16" Hole	d
10	6	1 3/8" Galv. Round Washer, 9/16" Hole	d
11	3	Locknuts for 1/2" Bolt	ek
12	4	Locknuts for 5/8" Bolt	ek
13	5	Locknuts for 3/4" Bolt	ek
14	3	Suspension Hook	eh
15	3	Suspension Clamp and Connecting Piece	ei
16	3	3"x8"x30 Ga. Copper Strip	

NOTE:

Make one turn of downlead underneath washer around overhead ground wire support bolts, and staple to pole so that it does not come in contact with crossarms or through bolts.

* As required. See Drg. TM-1

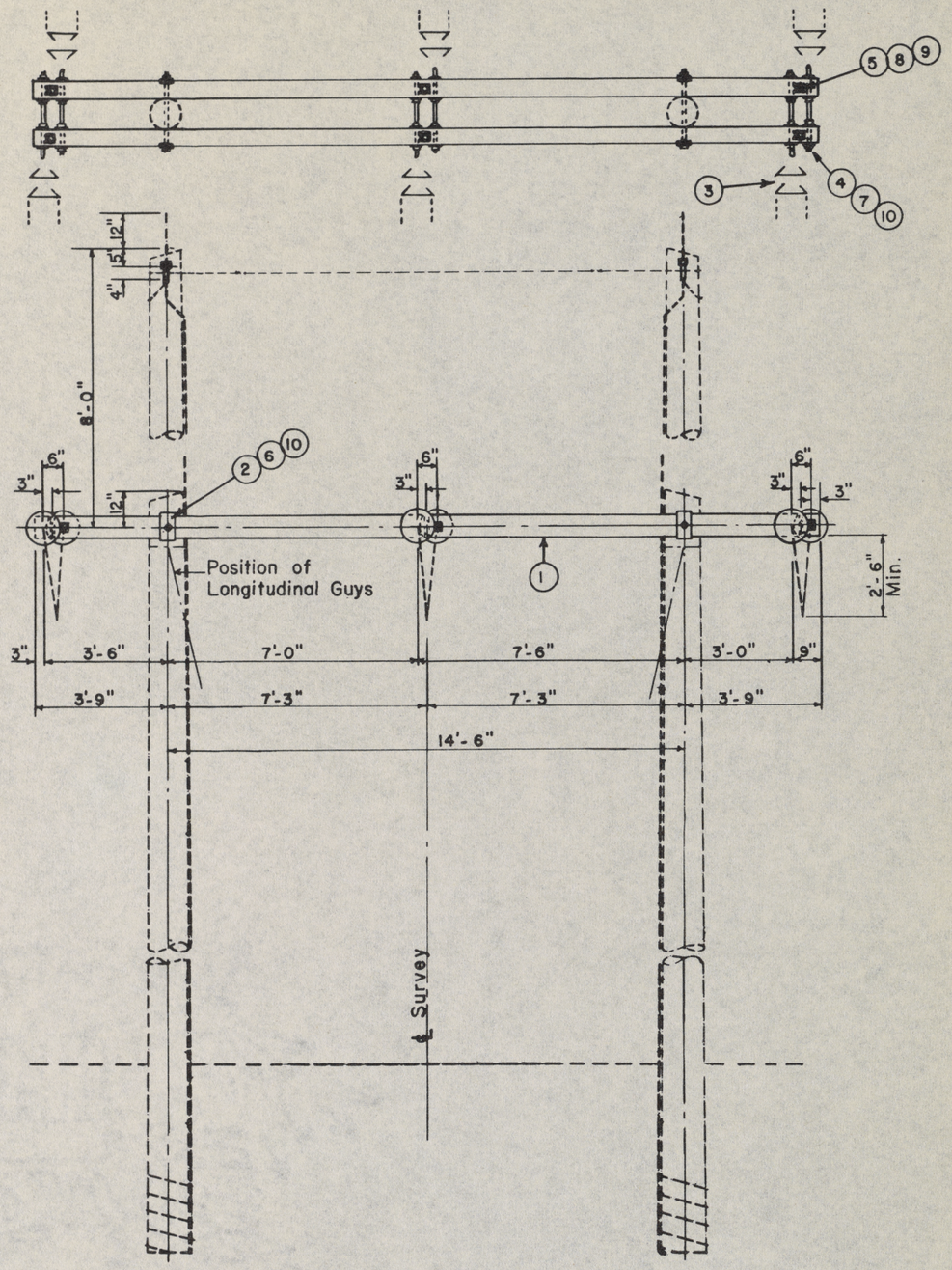
TRANSMISSION LINE TANGENT STRUCTURE
___ KV. H-FRAME SUSPENSION- TWO POLE
(115 KV. MAXIMUM)

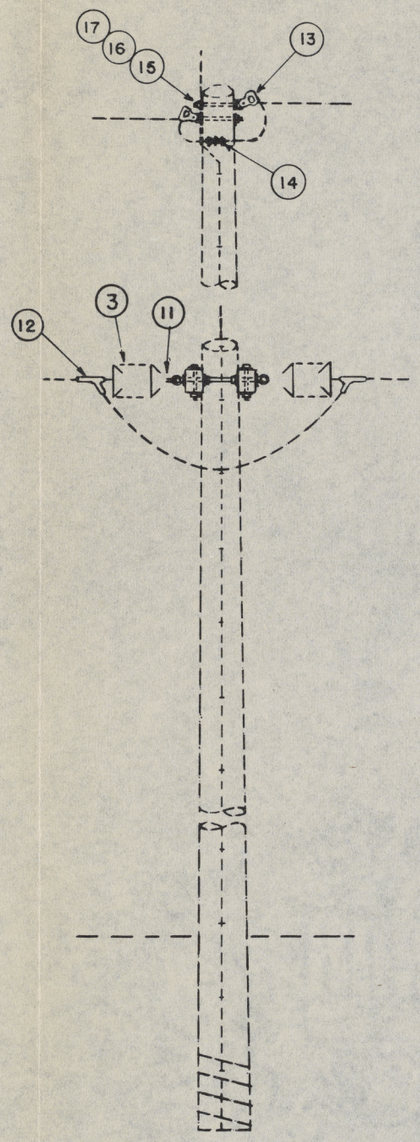
Scale: 1/4"=1'-0"

Date: 11-49

TH-1 A

267825 O - 53 (Fol. TA - 2) No. 3





LIST OF MATERIAL			
DRG. REF.	REQ'D	DESCRIPTION	ITEM
1	2	$5\frac{3}{4}$"x$7\frac{3}{4}$"x 22'-0" Wood Crossarm	g
2	4	Reinforcing Plate for 8" Crossarm	eg
3	*	5 3/4"x 10" Suspension Insulator	k
4	6	3/4" x 26" Double Arm Eye Bolt	o
5	6	5/8" x 10" Machine Bolt	c
6	2	3/4" x 26" Machine Bolt	c
7	24	4"x 4"x 3/16" Galv. Sq. Washer, 13/16" Hole	d
8	12	2 1/4"x 2 1/4"x 3/16" Galv. Sq. Washer, 13/16" Hole	d
9	6	Locknuts for 5/8" Bolt	ek
10	8	Locknuts for 3/4" Bolt	ek
11	6	Suspension Hook	eh
12	6	Dead End Clamp and Connecting Piece	ej

ADDITIONAL MATERIAL FOR TH-2G			
13	2	Ground Wire Dead End Clamp	l
14	1	6"- 3 Bolt Clamp	u
15	2	5/8"x 14" Eye Bolt	o
16	4	2 1/4"x 2 1/4"x 3/16" Galv. Sq. Washer, 13/16" Hole	d
17	2	Locknuts for 5/8" Bolt	ek

NOTE:

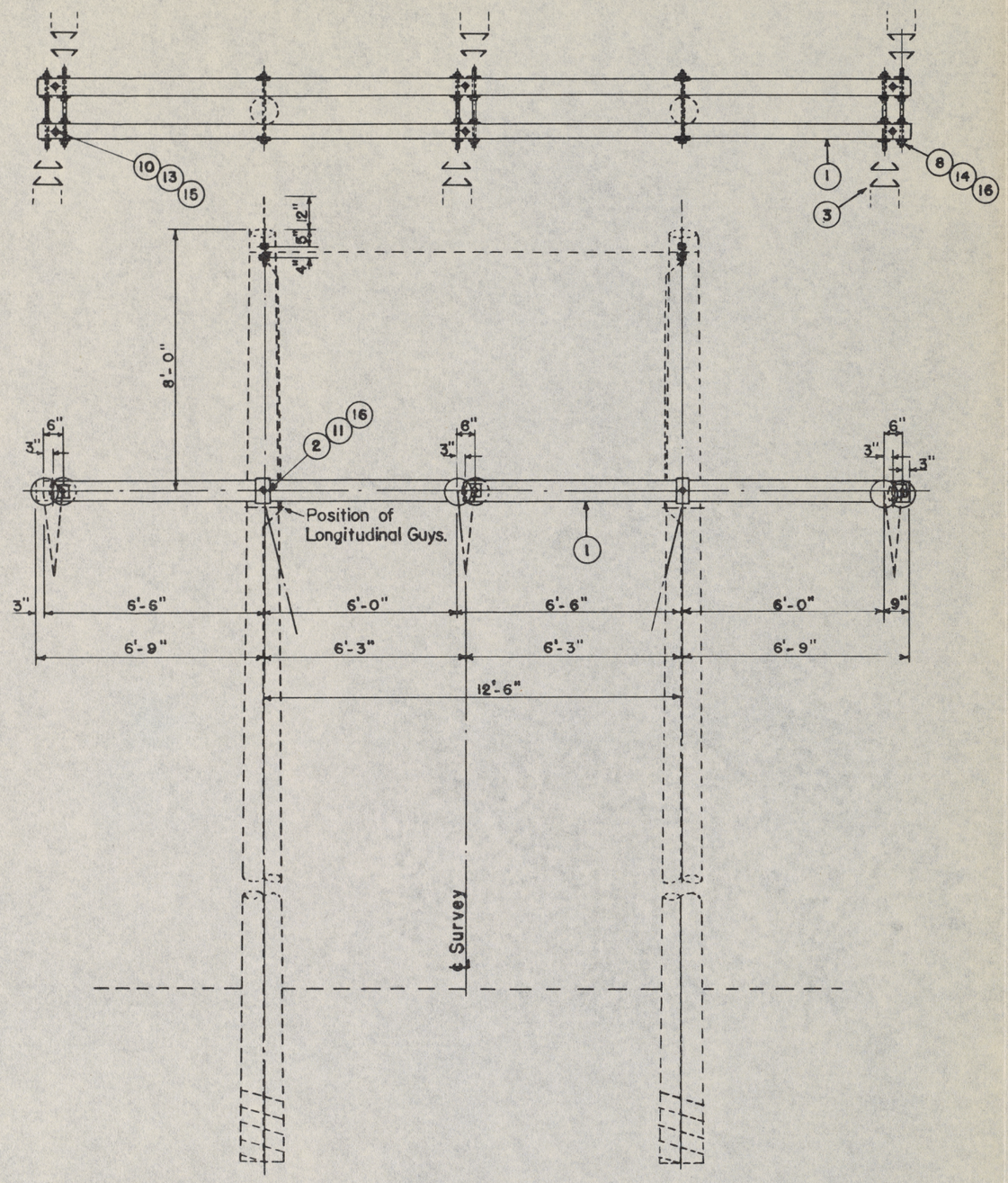
Make one turn of downlead underneath washer around overhead ground wire support bolts, and staple downlead so that it does not come in contact with crossarms or through bolts.

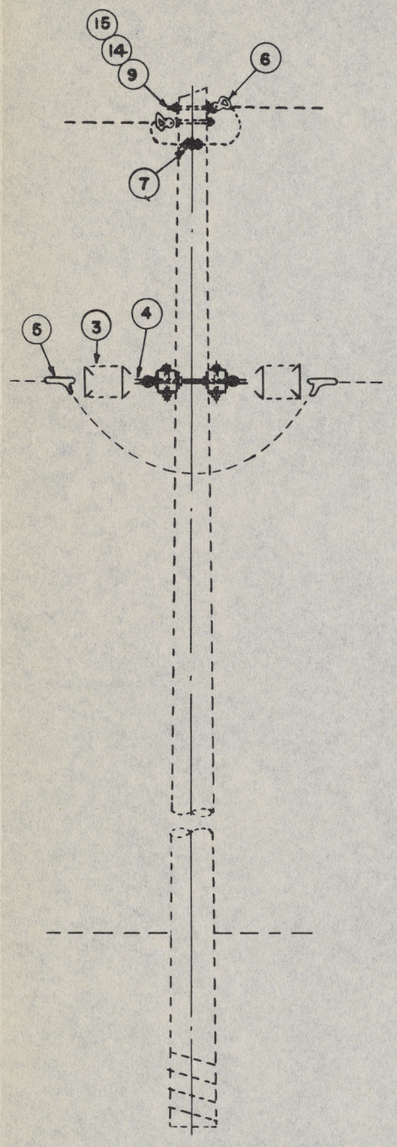
* As required, see Drg. TM-1
Designation with Overhead Ground Wire is TH-2G
Designation without Overhead Ground Wire is TH-2

TRANSMISSION LINE DEAD END STRUCTURE
_____KV. TWO POLE DOUBLE DEAD END
(34.5 TO 69 KV.)

Scale: 1/4"=1'-0"		Date: 11-49
		TH-2,2G

267825 O - 53 (Fol. TA - 2) No. 5





*As required. See Drg. TM-1

NOTE

Make one turn of downlead underneath washer around overhead ground wire support bolts, and staple downlead so that it does not come in contact with crossarms or through bolts.

LIST OF MATERIAL

DR'G REF.	REQ'D	DESCRIPTION	ITEM
1	2	5¾"x7¾"x 26'-0" Wood Crossarm	g
2	4	Reinforcing Plate for 8" Crossarm	eg
3	*	5 3/4"x 10" Suspension Insulator	k
4	6	Suspension Hook	eh
5	6	Dead End Clamp and Connecting Piece	ej
6	4	Ground Wire Dead End Clamp	l
7	2	6"- 3 Bolt Clamp	u
8	6	3/4"x 26" Double Arm Eyebolt	o
9	4	3/4"x 12" Eyebolt	o
10	6	5/8"x 10" Machine Bolt	c
11	2	3/4"x 26" Machine Bolt	c
12			
13	12	2 1/4"x 2 1/4"x 3/16" Galv. Sq. Washer, 13/16" Hole	d
14	32	4"x4"x 3/16" Galv. Sq. Washer, 13/16" Hole	d
15	6	Locknuts for 5/8" Bolt	ek
16	12	Locknuts for 3/4" Bolt	ek

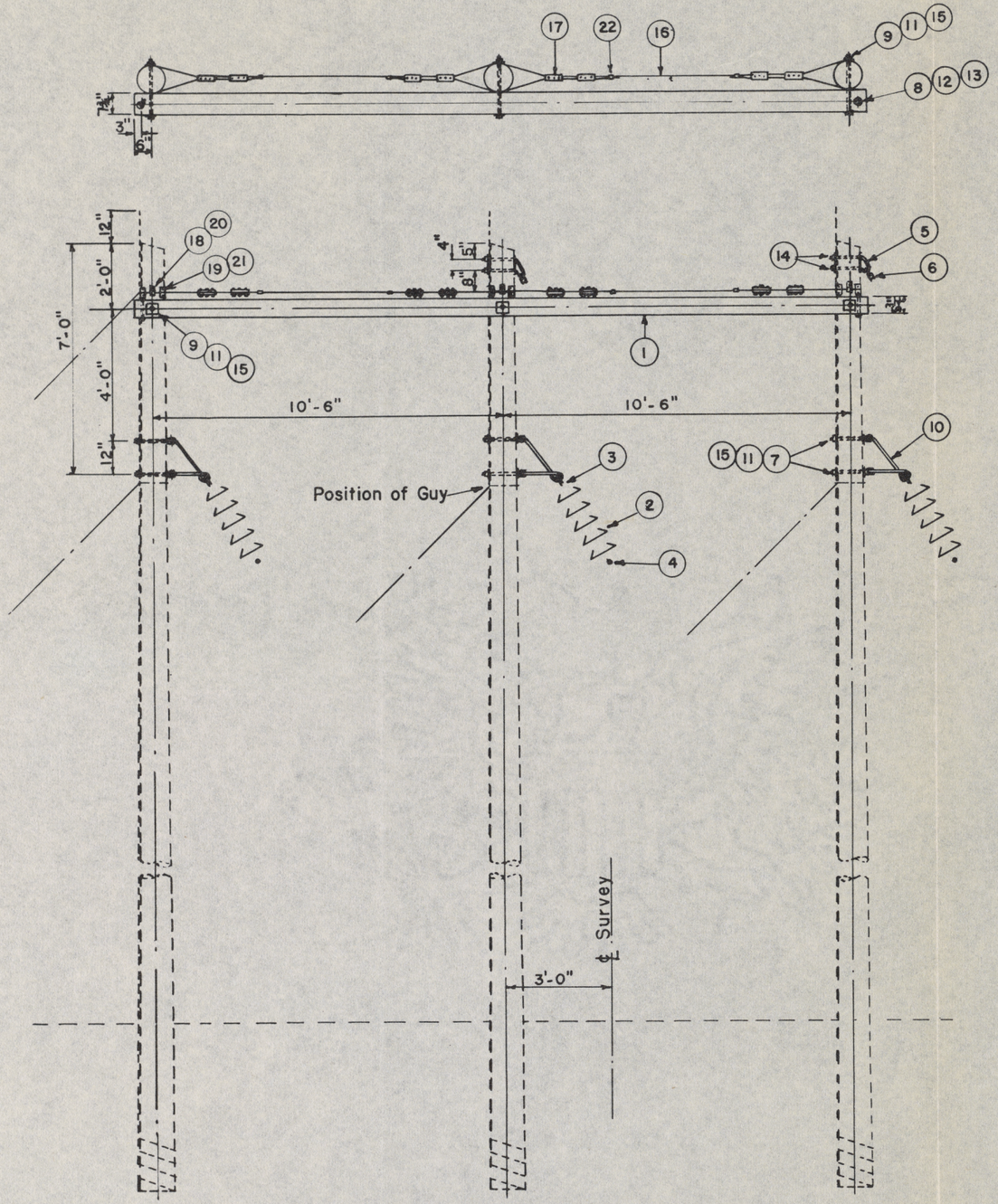
TRANSMISSION LINE DEAD END STRUCTURE

_____ KV. TWO POLE DOUBLE DEAD END

(115 KV. MAXIMUM)

Scale: 1/4"=1'-0"		Date: 11-49
		TH-2A

267825 O - 53 (Fol. TA - 2) No. 6



NOTE

Make one turn of downlead underneath washers around conductor support bolts and overhead ground wire support bolts.

LIST OF MATERIAL

DR'G REF.	REQ'D	DESCRIPTION	ITEM
1	1	5¾"x7¾" x 22'-0" Wood Crossarm	g
2	*	5 3/4"x 10" Suspension Insulator	k
3	3	Suspension Hook	eh
4	3	Suspension Clamp and Connecting Piece	ei
5	2	Ground Wire Cable Support	ed
6	2	Ground Wire Suspension Clamp	m
7	6	3/4"x 14" Clevis Bolt	ef
8	2	1/2"x 8" Machine Bolt	c
9	3	3/4"x 20" Machine Bolt	c
10	3	3/4" Angle Bracket	cr
11	18	4"x 4"x 3/16" Galv. Sq. Washer, 13/16" Hole	d
12	4	1 3/8" Galv. Round Washer, 9/16" Hole	d
13	2	Locknuts for 1/2" Bolt	ek
14	4	Locknuts for 5/8" Bolt	ek
15	9	Locknuts for 3/4" Bolt	ek
16	50'	Guy Wire	y
17	8	3 Bolt Guy Clamp - 6" Long	u
18	6	Guy Hook	bj
19	6	Guy Plate	bk
20	6	1/2"x 4" Lag Screw	j
21	3/16*	6 d Copperweld Nails	bp
22	4	Guy Clip	dz

*As required. See Drg. TM-1

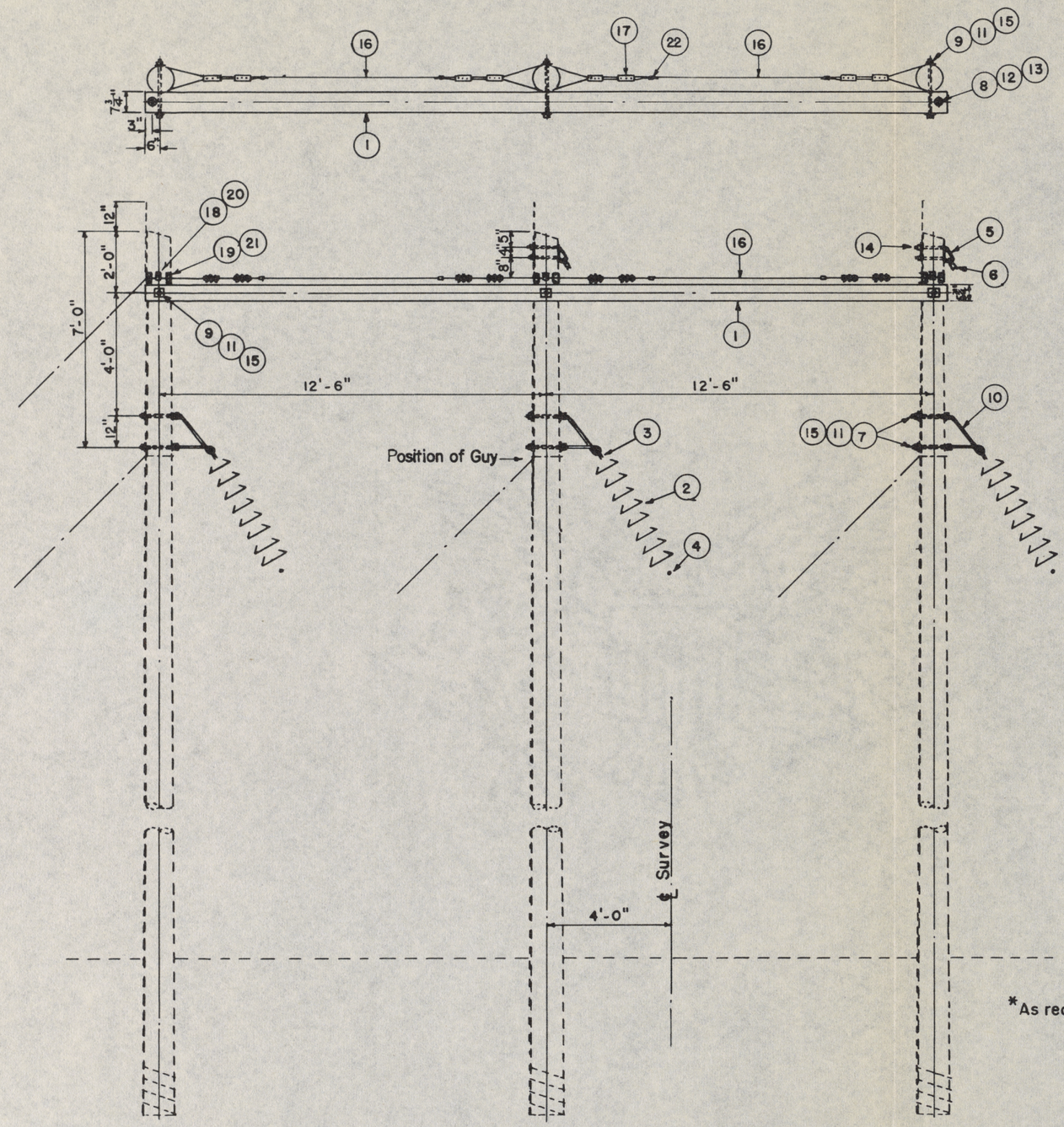
TRANSMISSION LINE MEDIUM ANGLE STRUCTURE

____ KV. H-FRAME SUSPENSION-THREE POLE

69 KV. MAXIMUM - 10'-6" POLE SPACING

Scale: 1/4"=1'-0"		Date: 11-49
		TH-3

267825 O - 53 (Fol. TA - 2) No. 7



*As required. See Drg. TM-1

LIST OF MATERIAL			
DR'G REF.	REQ'D	DESCRIPTION	ITEM
1	1	5¾"x7¾"x 26'-0" Wood Crossarm	g
2	*	5 3/4"x 10" Suspension Insulator	k
3	3	Suspension Hook	eh
4	3	Suspension Clamp and Connecting Piece	ei
5	2	Ground Wire Cable Support	ed
6	2	Ground Wire Suspension Clamp	m
7	6	3/4"x 14" Clevis Bolt	ef
8	2	1/2"x 8" Machine Bolt	c
9	3	3/4"x 20" Machine Bolt	c
10	3	3/4" Angle Bracket	cr
11	18	4"x 4"x 3/16" Galv. Sq. Washer, 13/16" Hole	d
12	4	1 3/8" Galv. Round Washer, 9/16" Hole	d
13	2	Locknuts for 1/2" Bolt	ek
14	4	Locknuts for 5/8" Bolt	ek
15	9	Locknuts for 3/4". Bolt	ek
16	50'	Guy Wire	y
17	8	3 Bolt Guy Clamp - 6" Long	u
18	6	Guy Hook	bj
19	6	Guy Plate	bk
20	6	1/2"x 4" Lag Screw	j
21	3/16*	6 d Copperweld Nails	bp
22	4	Guy Clip	dz

NOTE

Make one turn of downlead underneath washers around conductor support bolts and overhead ground wire support bolts.

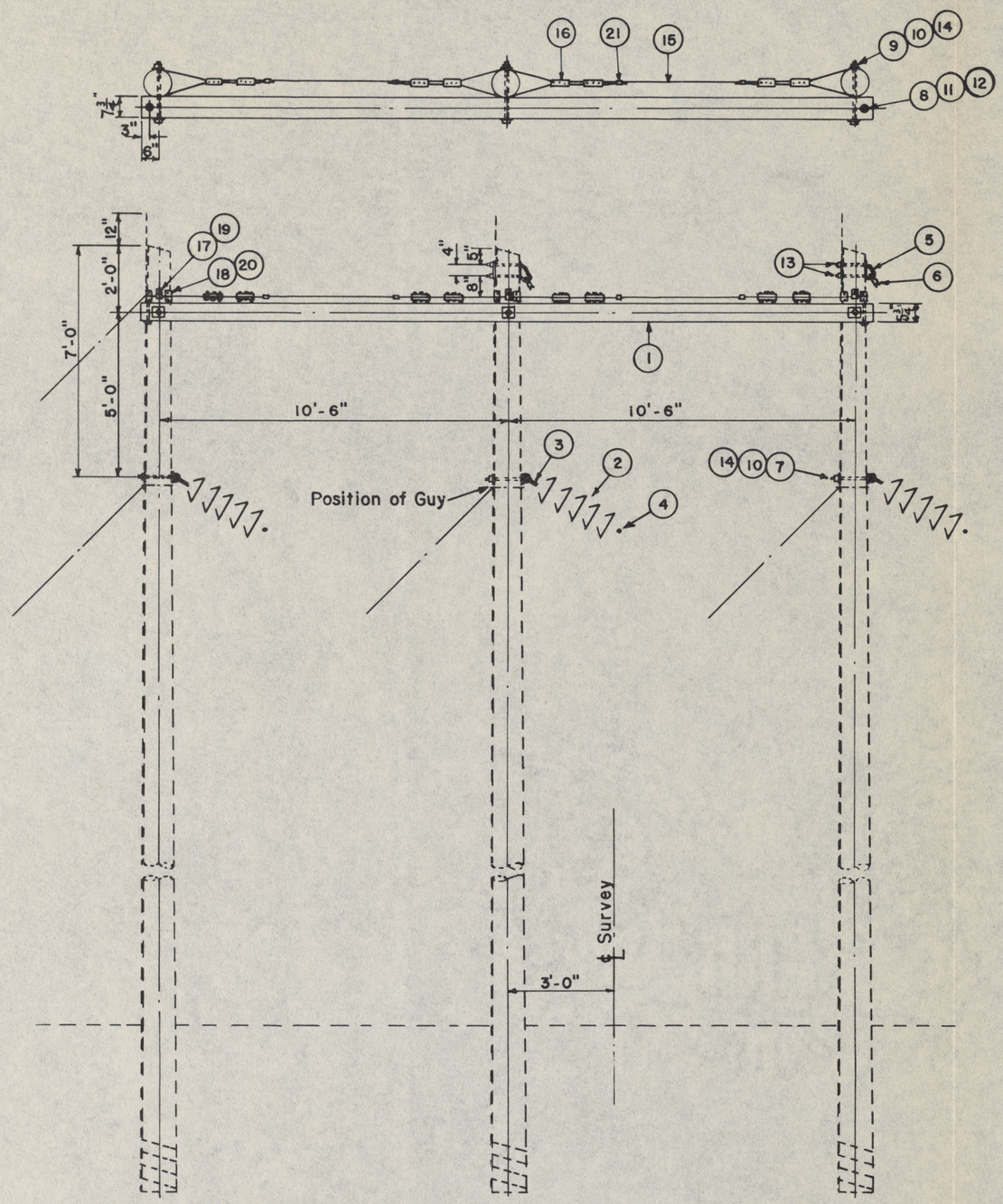
TRANSMISSION LINE MEDIUM ANGLE STRUCTURE

____KV. H-FRAME SUSPENSION- THREE POLE

115 KV. MAXIMUM - 12'-6" POLE SPACING

Scale: 1/4"=1'-0"		Date: 11-4-9
		TH-3A

267825 O - 53 (Fol. TA - 2) No. 8



NOTE

Make one turn of downlead underneath washers around conductor support bolts and overhead ground wire support bolts.

LIST OF MATERIAL

DR'G REF.	REQ'D	DESCRIPTION	ITEM
1	1	5¾"x7¾" x 22'-0" Wood Crossarm	g
2	*	5 3/4"x 10" Suspension Insulator	k
3	3	Suspension Hook	eh
4	3	Suspension Clamp and Connecting Piece	ei
5	2	Ground Wire Cable Support	ed
6	2	Ground Wire Suspension Clamp	m
7	3	3/4"x 14" Eye Bolt	o
8	2	1/2"x 8" Machine Bolt	c
9	3	3/4"x 20" Machine Bolt	c
10	12	4"x 4"x 3/16" Galv. Sq. Washer, 13/16" Hole	d
11	4	1 3/8" Galv. Round Washer, 9/16" Hole	d
12	2	Locknuts for 1/2" Bolt	ek
13	4	Locknuts for 5/8" Bolt	ek
14	6	Locknuts for 3/4" Bolt	ek
15	46'	Guy Wire	y
16	8	3 Bolt Guy Clamp - 6" Long	u
17	6	Guy Hook	bj
18	6	Guy Plate	bk
19	6	1/2"x 4" Lag Screw	j
20	3/16*	6 d Copperweld Nails	bp
21	4	Guy Clip	dz

*As required. See Drg. TM-1

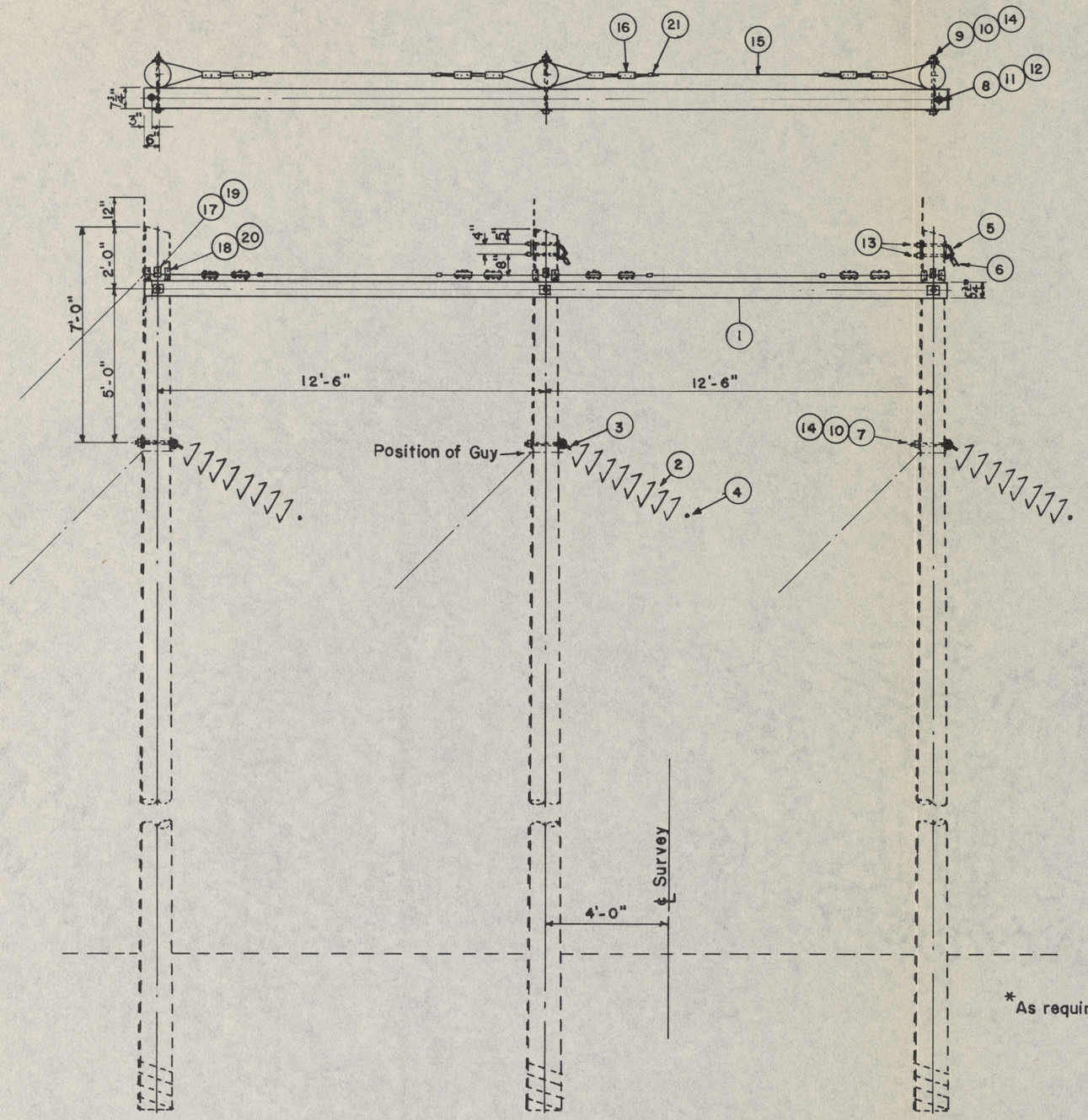
TRANSMISSION LINE LARGE ANGLE STRUCTURE

____KV. H-FRAME SUSPENSION-THREE POLE

69 KV. MAXIMUM - 10'-6" POLE SPACING

Scale: 1/4"=1'-0"		Date: 11-49
		TH-4

267825 O - 53 (Fol. TA - 2) No. 9



*As required. See Drg. TM-1

NOTE

Make one turn of downlead underneath washers around conductor support bolts and overhead ground wire support bolts.

LIST OF MATERIAL

DR'G REF.	REQ'D	DESCRIPTION	ITEM
1	1	5¾"x7¾"x 26'-0" Wood Crossarm	g
2	*	5 3/4" x 10" Suspension Insulator	k
3	3	Suspension Hook	eh
4	3	Suspension Clamp and Connecting Piece	ei
5	2	Ground Wire Cable Support	ed
6	2	Ground Wire Suspension Clamp	m
7	3	3/4"x 14" Eye Bolt	o
8	2	1/2"x 8" Machine Bolt	c
9	3	3/4"x 20" Machine Bolt	c
10	12	4"x 4"x 3/16" Galv. Sq. Washer, 13/16" Hole	d
11	4	1 3/8" Galv. Round Washer, 9/16" Hole	d
12	2	Locknuts for 1/2" Bolt	ek
13	4	Locknuts for 5/8" Bolt	ek
14	6	Locknuts for 3/4" Bolt	ek
15	46'	Guy Wire	y
16	8	3 Bolt Guy Clamp - 6" Long	u
17	6	Guy Hook	bj
18	6	Guy Plate	bk
19	6	1/2"x 4" Lag Screw	j
20	3/16#	6 d Copperweld Nails	bp
21	4	Guy Clip	dz

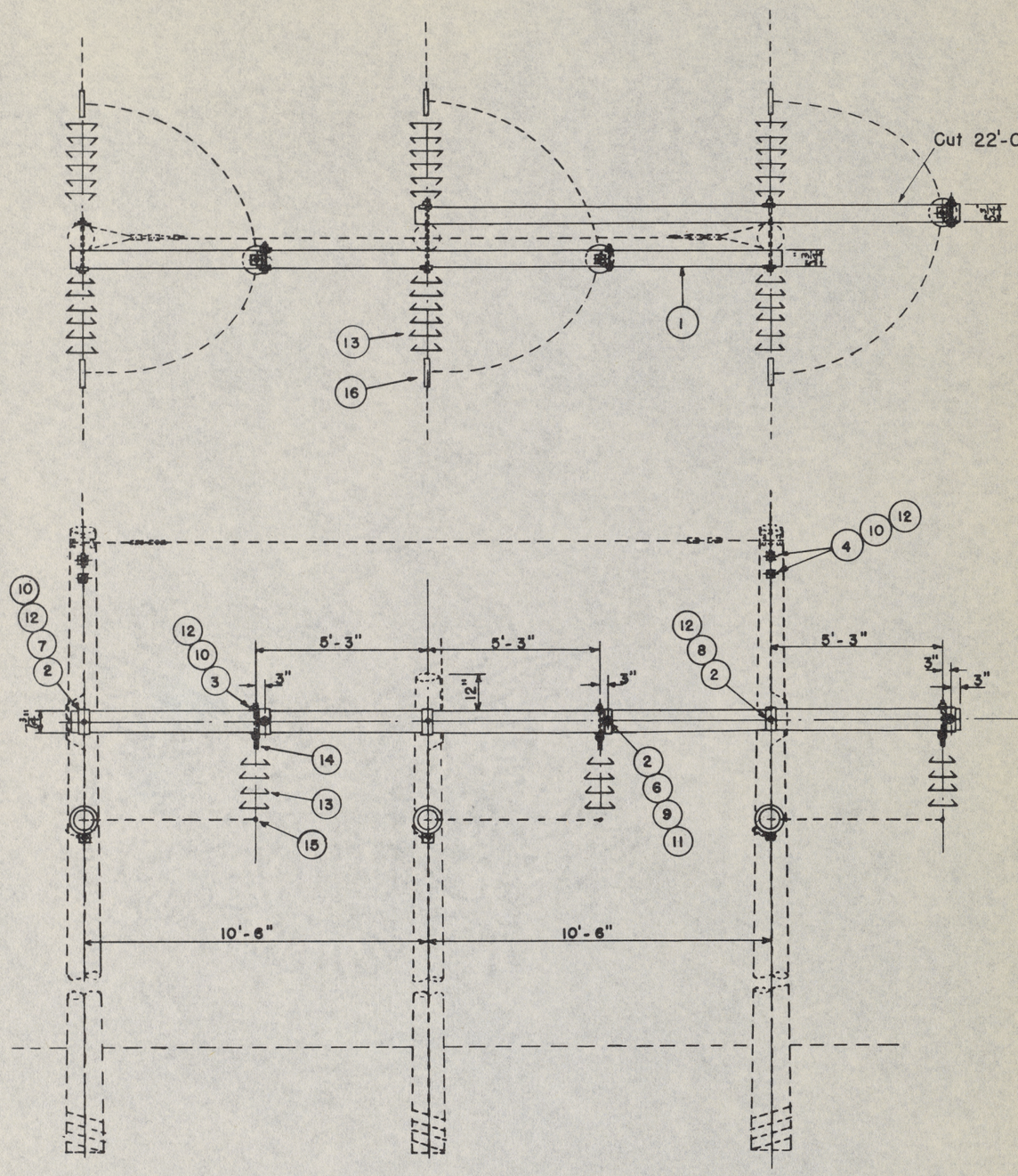
TRANSMISSION LINE LARGE ANGLE STRUCTURE

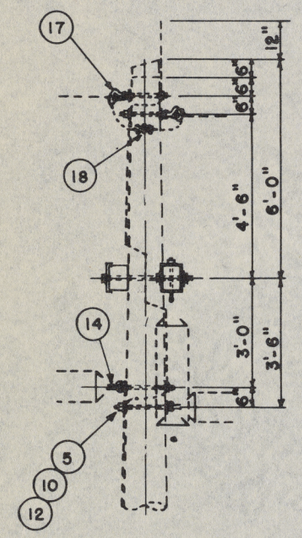
___ KV. H-FRAME SUSPENSION - THREE POLE

115 KV. MAXIMUM - 12'-6" POLE SPACING

Scale: 1/4"=1'-0"		Date: 11-49
		TH-4A

267825 O - 53 (Fol. TA - 2) No. 10





*As required. See Drg. TM-1

LIST OF MATERIAL			
DR'G. REF.	REQ'D	DESCRIPTION	ITEM
1	2	5¾"x7¾"x22'-0" Wood Crossarm	g
2	11	Reinforcing Plate for 8" Crossarm	eg
3	3	3/4" x 10" Eye Bolt	o
4	4	3/4"x 12" Eye Bolt	o
5	6	3/4"x 14" Eye Bolt	o
6	3	1/2"x 8" Machine Bolt	c
7	1	3/4"x 20" Machine Bolt	c
8	2	3/4"x 26" Machine Bolt	c
9	6	1 3/8" Galv. Round Washer, 9/16" Hole	d
10	27	4" x 4" x 3/16" Galv. Sq. Washer, 13/16" Hole	d
11	3	Locknuts for 1/2" Bolt	ek
12	16	Locknuts for 3/4" Bolt	ek
13	*	5 3/4" x 10" Suspension Insulator	k
14	9	Suspension Hook	eh
15	3	Suspension Clamp and Connecting Piece	ei
16	6	Conductor Dead End Clamp and Connecting Piece	ej
17	4	Ground Wire Dead End Clamp	l
18	2	3 Bolt Clamp - 6" Long	u

NOTE

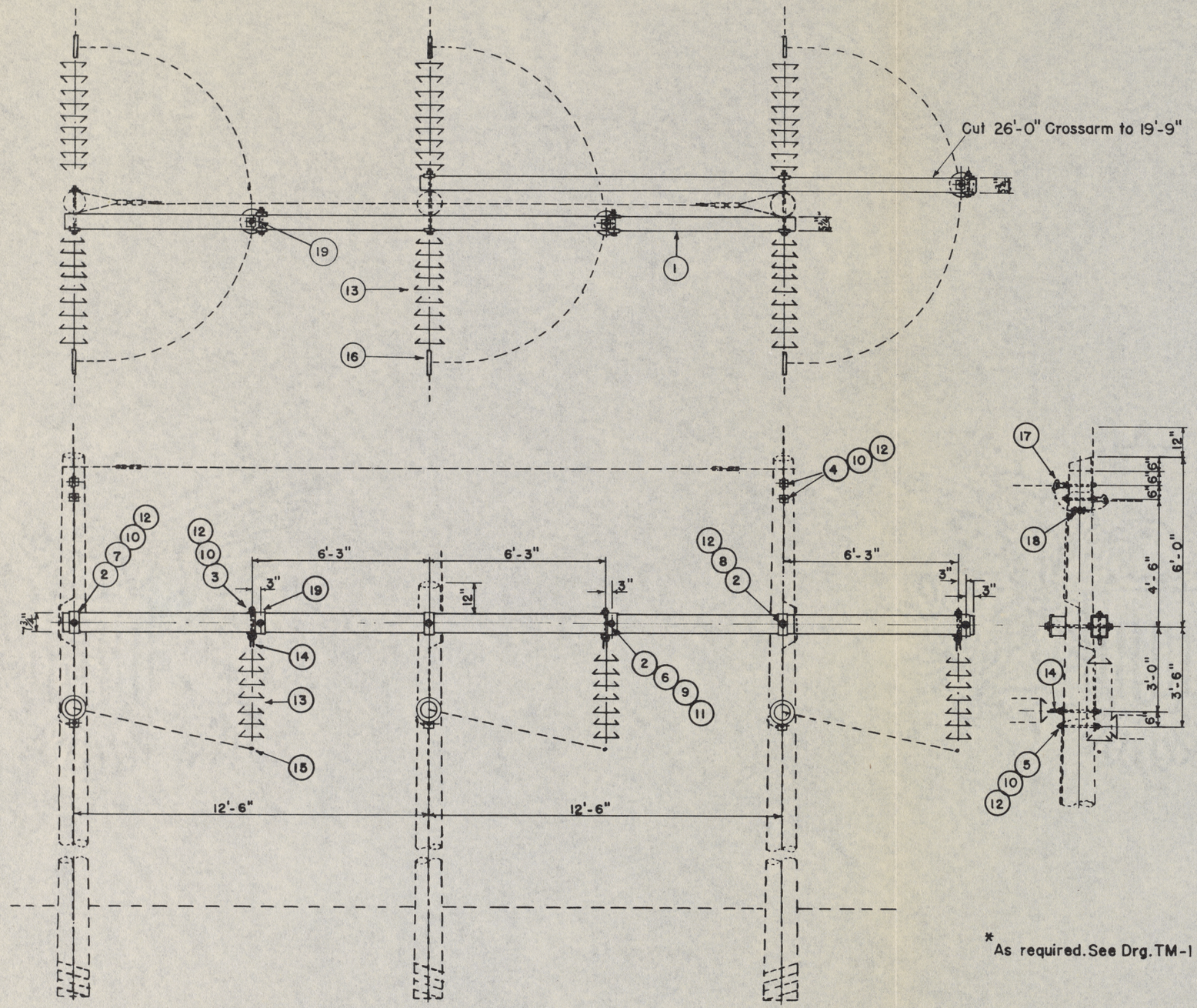
Make one turn of downlead underneath washers around conductor support bolts and overhead ground wire support bolts, and staple to pole so that it does not come in contact with crossarms or through bolts.

TRANSMISSION LINE DEAD END STRUCTURE

___ KV. THREE POLE DOUBLE DEAD END

69 KV. MAXIMUM - 10'-6" POLE SPACING

Scale: 1/4"=1'-0"		Date: 11-49
		TH-5



*As required. See Drg. TM-1

NOTE

Make one turn of downlead underneath washers around conductor support bolts and overhead ground wire support bolts, and staple to pole so that it does not come in contact with crossarms or through bolts.

LIST OF MATERIAL

DR'G REF.	REQ'D	DESCRIPTION	ITEM
1	2	5¾"x7¾"x 26'-0" Wood Crossarm	g
2	11	Reinforcing Plate for 8" Crossarm	eg
3	3	3/4"x 10" Eye Bolt	o
4	4	3/4"x 12" Eye Bolt	o
5	6	3/4"x 14" Eye Bolt	o
6	3	1/2"x 8" Machine Bolt	c
7	1	3/4"x 20" Machine Bolt	c
8	2	3/4"x 26" Machine Bolt	c
9	6	1 3/8" Galv. Round Washer, 9/16" Hole	d
10	27	4"x 4"x 3/16" Galv. Sq. Washer, 13/16" Hole	d
11	3	Locknuts for 1/2" Bolt	ek
12	16	Locknuts for 3/4" Bolt	ek
13	*	5 3/4"x 10" Suspension Insulator	k
14	9	Suspension Hook	eh
15	3	Suspension Clamp and Connecting Piece	ei
16	6	Conductor Dead End Clamp and Connecting Piece	ej
17	4	Ground Wire Dead End Clamp	l
18	2	3 Bolt Clamp-6" Long	u
19	3	3"x 8"x 30 Ga. Copper Strip	

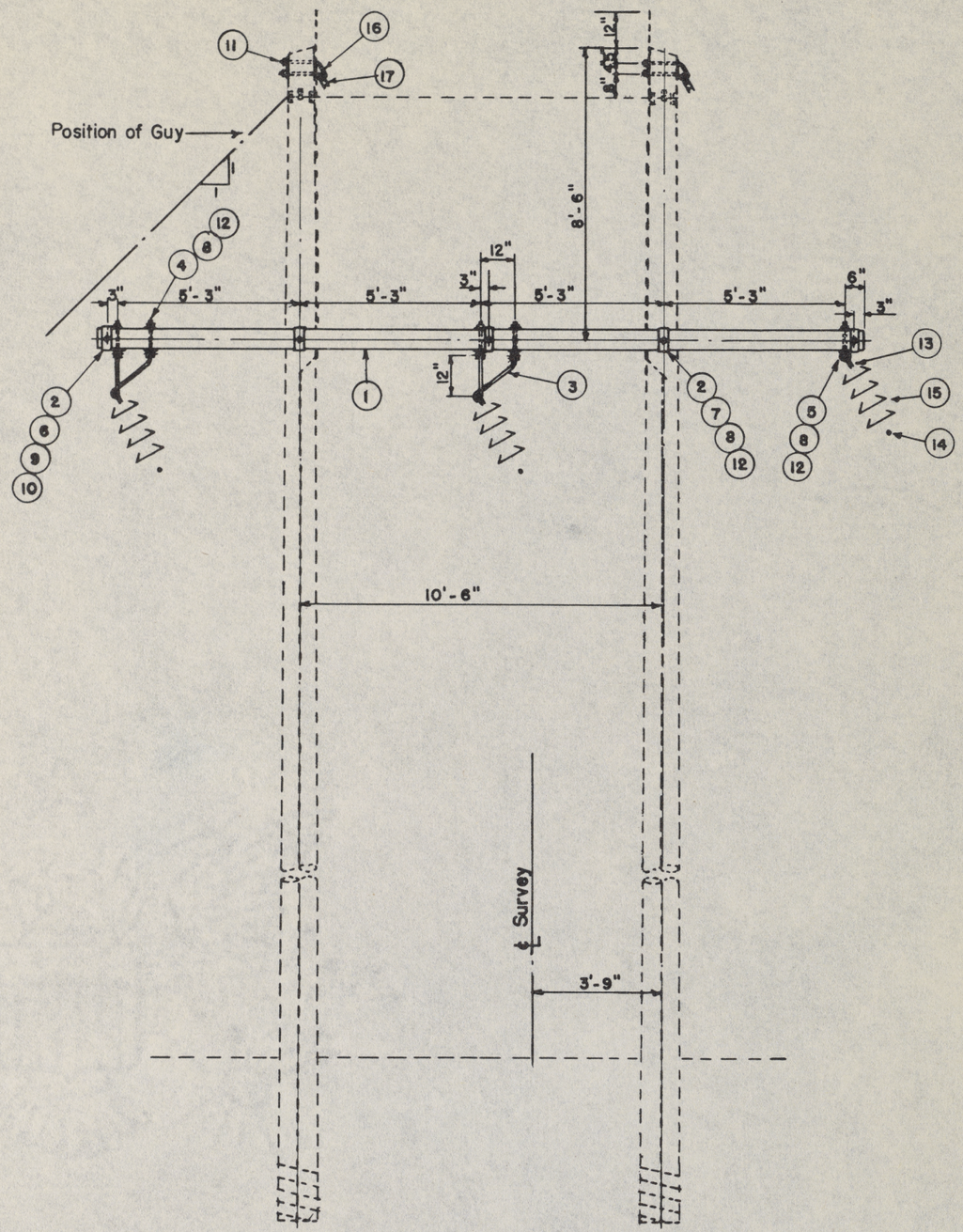
TRANSMISSION LINE DEAD END STRUCTURE

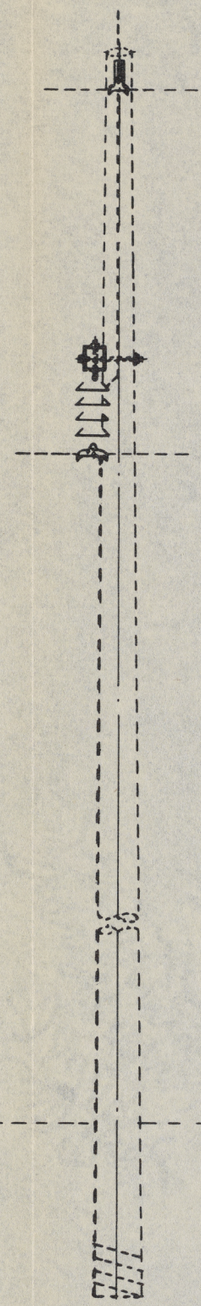
___ KV. THREE POLE DOUBLE DEAD END

115 KV. MAXIMUM - 12'-6" POLE SPACING

Scale: 1/4"=1'-0"		Date: 11-49
		TH-5A

267825 O - 53 (Fol. TA - 2) No. 12





NOTE

Make one turn of downlead underneath washer around overhead ground wire support bolts and staple to pole so that it does not come in contact with crossarm or through bolts.

LIST OF MATERIAL

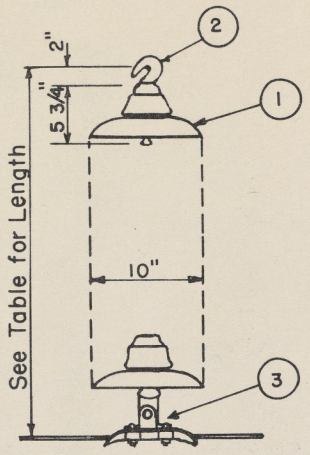
DR'G REF.	REQ'D	DESCRIPTION	ITEM
1	1	5¾"x7¾"x22'-0" Wood Crossarm	g
2	8	Reinforcing Plate for 8" Crossarm	eg
3	2	3/4" Angle Bracket	cr
4	4	3/4"x 10" Clevis Bolt	ef
5	1	3/4"x 10" Eye Bolt	o
6	3	1/2"x 8" Machine Bolt	c
7	2	3/4"x 18" Machine Bolt	c
8	12	4"x 4"x 3/16" Galv. Sq. Washer, 13/16" Hole	d
9	6	1 3/8" Galv. Round Washer, 9/16" Hole	d
10	3	Locknuts for 1/2" Bolt	ek
11	4	Locknuts for 5/8" Bolt	ek
12	7	Locknuts for 3/4" Bolt	ek
13	3	Suspension Hook	eh
14	3	Suspension Clamp and Connecting Piece	ei
15	12	5 3/4"x 10" Suspension Insulator	k
16	2	Ground Wire Cable Support	ed
17	2	Ground Wire Suspension Clamp	m

TRANSMISSION LINE MEDIUM ANGLE STRUCTURE

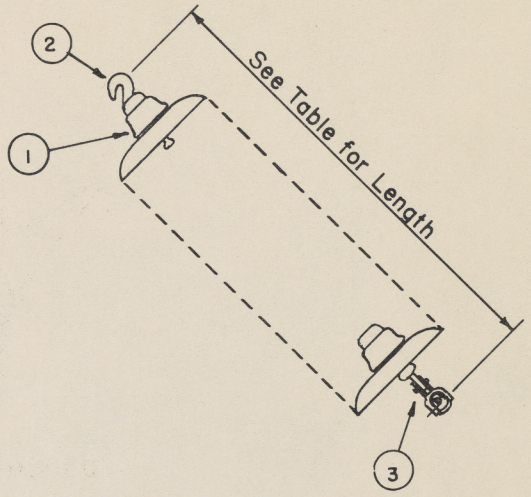
___KV. H-FRAME SUSPENSION - TWO POLE WITH BRACKETS (69 KV. MAXIMUM)

Scale: 1/4"=1'-0"		Date: 11-4-9
		TH-6

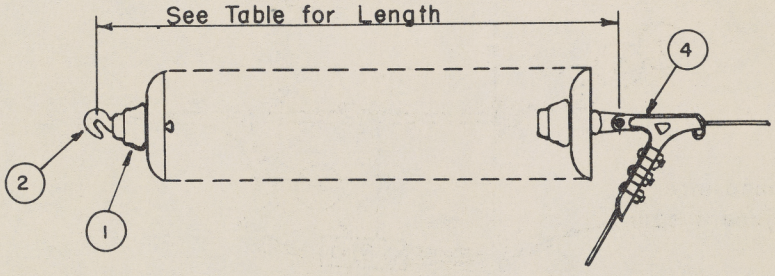
267825 O - 53 (Fol. TA - 2) No. 13



TANGENT ASSEMBLY



ANGLE ASSEMBLY



DEAD END ASSEMBLY

NOTE:

Suitable conductor clamps must be selected for the conductor being used. The exact length of suspension and angle strings will depend on the clamp used.

* Tangent String

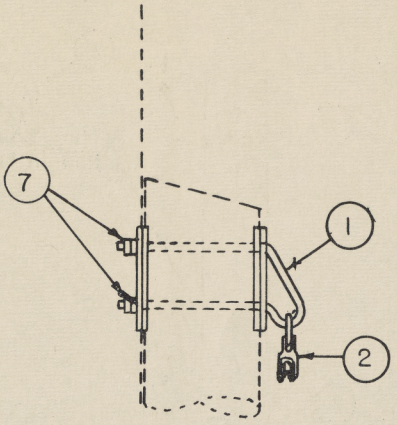
VOLTAGE CLASS	TANGENT		ANGLE		DEAD END		IMPULSE VALUE	
	UNITS	LENGTH	UNITS	LENGTH	UNITS	LENGTH		
34.5 KV.			3	2'-0" ±	4	2'-3" ±		
46 KV.	3	2'-0" ±	4	2'-6" ±	5	2'-9" ±	345 *	
69 KV.	4	2'-6" ±	5	3'-0" ±	6	3'-2" ±	415 *	
115 KV.	7	3'-11" ±	8	4'-5" ±	9	4'-8" ±	670 *	

LIST OF MATERIAL

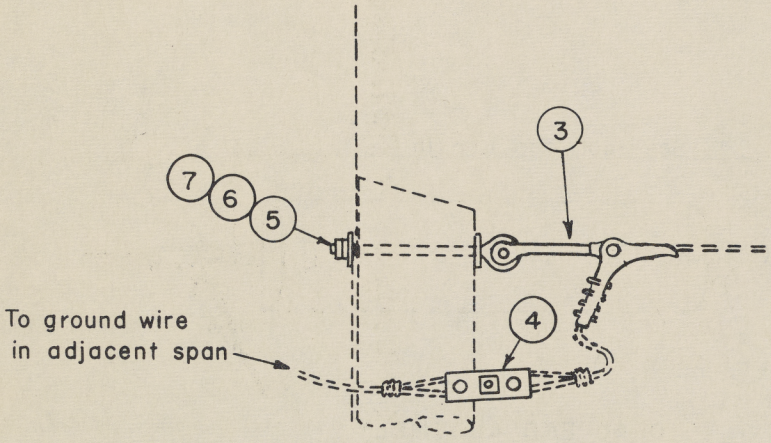
DRG. REF.	REQ'D	DESCRIPTION	ITEM
1		5 3/4" x 10" Suspension Insulator	k
2	1	Suspension Hook	eh
3	1	Suspension Clamp & Connecting Piece	m
4	1	Dead End Clamp & Connecting Piece	l

GUIDE TO INSULATOR STRING ASSEMBLIES

Scale: 3/4"=1'-0"		Date:
		TM-1



SUSPENSION ASSEMBLY
TM-2



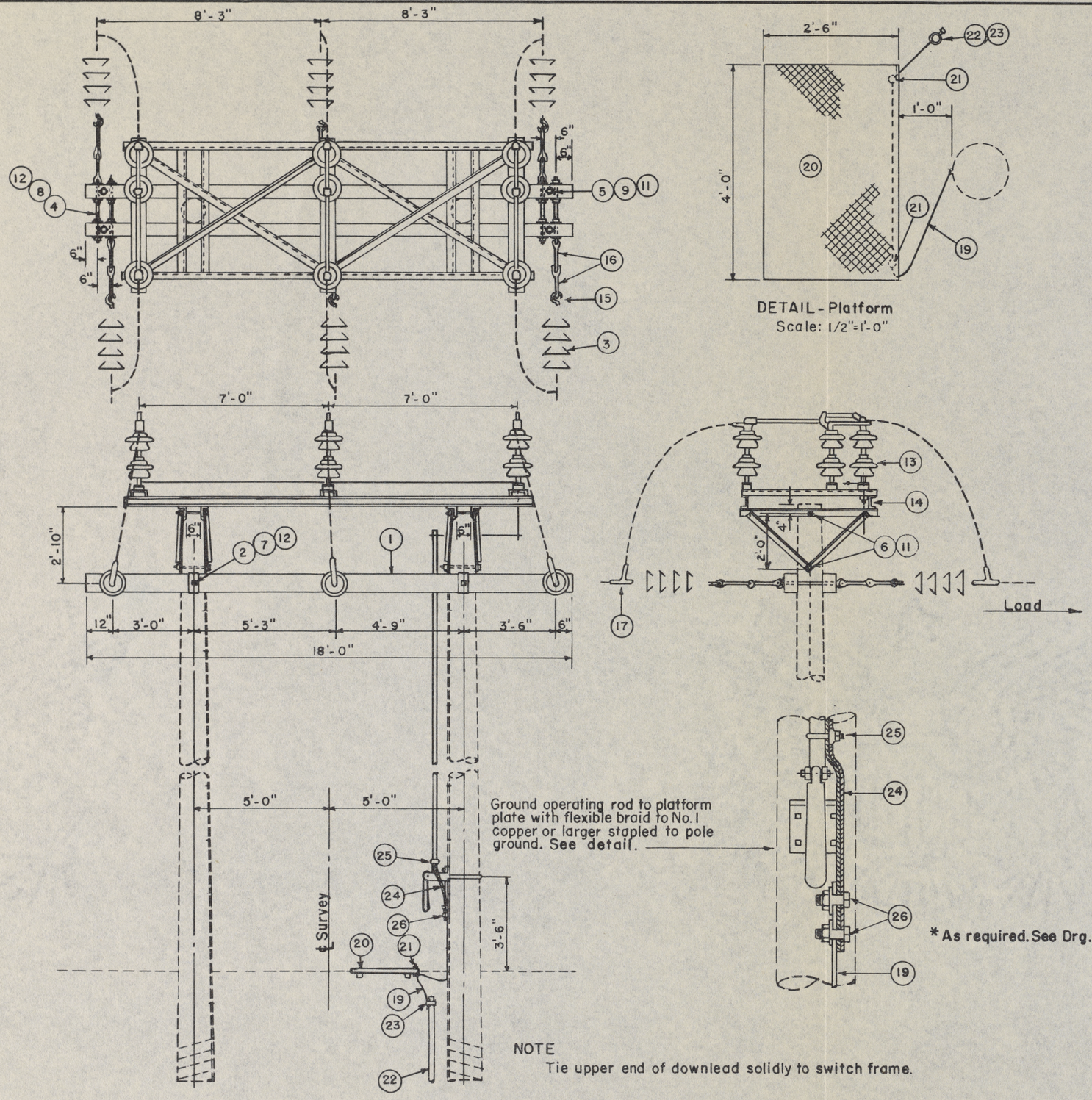
DEAD END ASSEMBLY
TM-2A

LIST OF MATERIAL

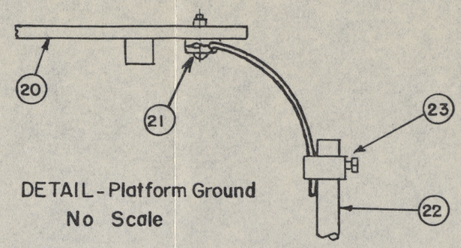
DR'G REF.	REQUIRED TM-2	REQUIRED TM-2A	DESCRIPTION	ITEM
1	1		Overhead Ground Wire Cable Support	ed
2	1		Ground Wire Suspension Clamp	m
3		1	Ground Wire Dead End Clamp	l
4		1	6" 3-Bolt Clamp	u
5		1	5/8"x 14" Eye Bolt	o
6		2	2 1/4"x 2 1/4"x 3/16" Galv. Sq. Washer, 13/16" Hole	d
7	2	1	Locknuts for 5/8" Bolt	ek

GUIDE TO OVERHEAD GROUND WIRE ASSEMBLIES

Scale: 1"=1'-0"		Date: 11-49
		TM-2, 2A



DETAIL - Platform
Scale: 1/2"=1'-0"



DETAIL - Platform Ground
No Scale

*As required. See Drg. TM-1

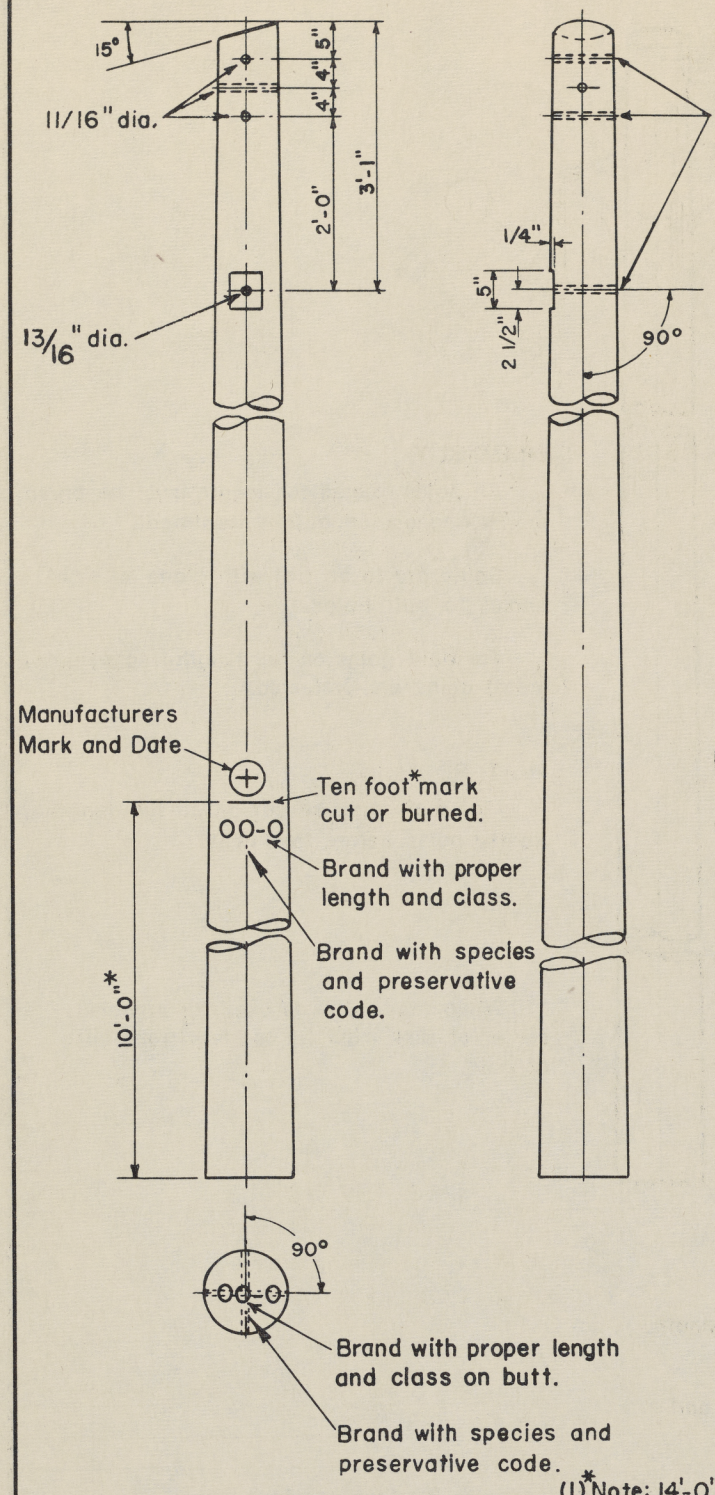
NOTE
Tie upper end of downlead solidly to switch frame.

LIST OF MATERIAL

DRG. REF.	REQ'D	DESCRIPTION	ITEM
1	2	5¾"x7¾"x 18'-0" Wood Crossarm	g
2	4	Reinforcing Plate for 8" Crossarm	eg
3	*	5 3/4"x 10" Suspension Insulator	k
4	6	3/4" x 26" Double Arm Eye Bolt	dy
5	6	5/8"x 10" Machine Bolt	c
6	4	5/8"x12" Machine Bolt	c
7	2	3/4"x 26" Machine Bolt	c
8	24	4"x4"x 3/16" Galv. Sq. Washer, 13/16" Hole	d
9	12	2 1/4"x 2 1/4"x 3/16" Galv. Sq. Washer, 13/16" Hole	d
10			
11	10	Locknuts for 5/8" Bolt	ek
12	8	Locknuts for 3/4" Bolt	ek
13	1	3 Phase, Group Operated Switch and Control Assembly	cg
14	1	Steel Support Assembly for Switch	
15	6	Suspension Hook	eh
16	12	Extension Link	du
17	6	Dead End Clamp and Connecting Piece	ej
18			
19	15'	No. 1 Solid Copper Wire	cj
20	1	Grounded Iron Platform Plate	
21	2	Grounding Connector - Single Groove	dp
22	1	5/8"x 8'-0" Ground Rod	aj
23	1	Ground Rod Clamp	ai
24	1	Flexible Braided Strap (Furnished with switch)	
25	1	Flexible Strap Clamp (Furnished with switch)	
26	2	Split Bolt Connector	p

TRANSMISSION LINE SECTIONALIZING STRUCTURE
_____ KV. AIR BREAK SWITCH
(69 KV. MAXIMUM)

Scale: 1/4"=1'-0"		Date: 11-49
		TM-3



FRAMING

All poles treated full length must be bored, roofed, and gained before treatment.

Gains are to be flat with plane at right angles to bolt hole.

For field gains on full length treated poles metal gains are preferred.

FLAT ROOF

Flat roofs may be cut on all full-length treated poles before treatment.

When metal disk is used for branding, center of disk must be ten feet* from butt of pole.

(1) *Note: 14'-0" mark for poles 70 feet and longer.

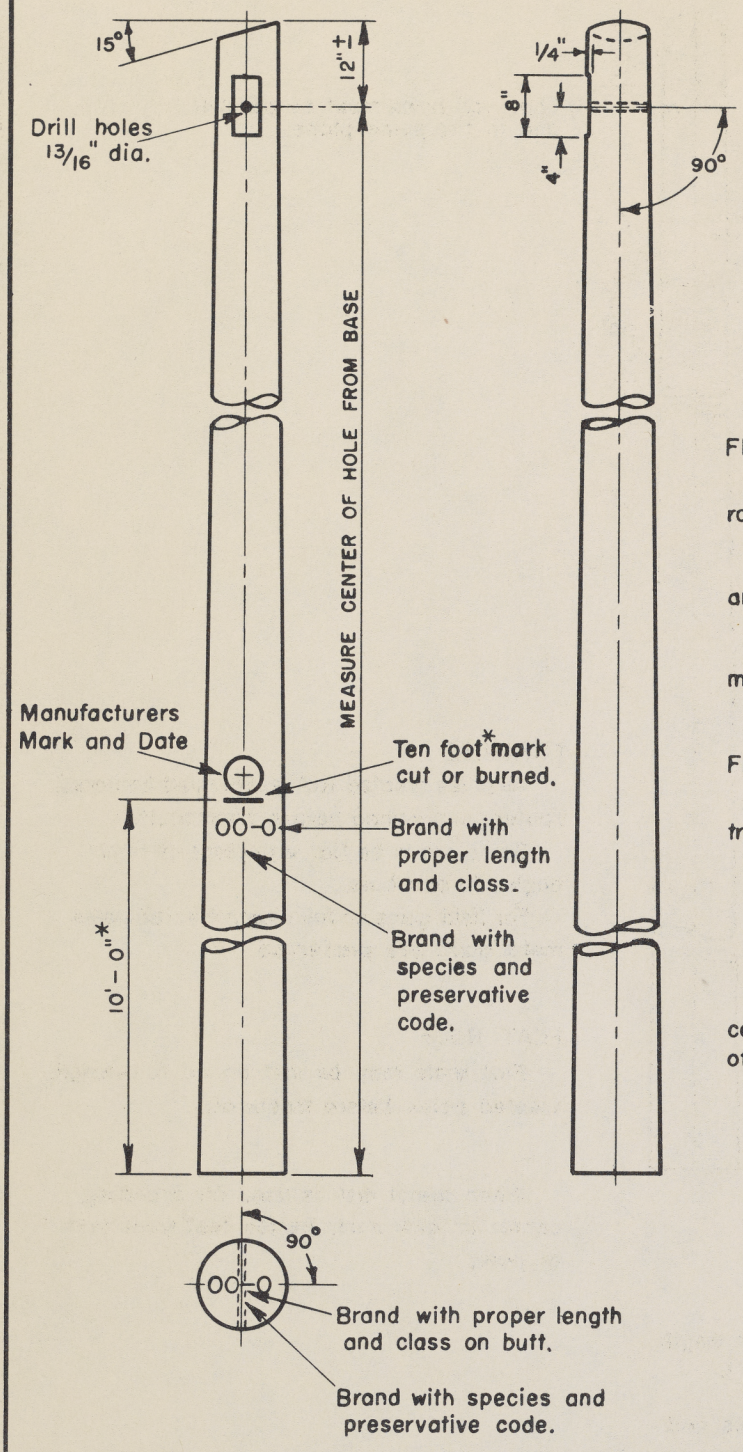
TRANSMISSION LINE POLE FRAMING FOR STRUCTURE TP-1

NO	REVISION	DATE
1		7-53

Scale: 1/2"=1'-0"

Date: 11-49

TM-4



FRAMING

All poles treated full length must be bored, roofed, and gained before treatment.

Gains are to be flat with plane at right angles to bolt holes.

For field gains on full length treated poles metal gains are preferred.

FLAT ROOF

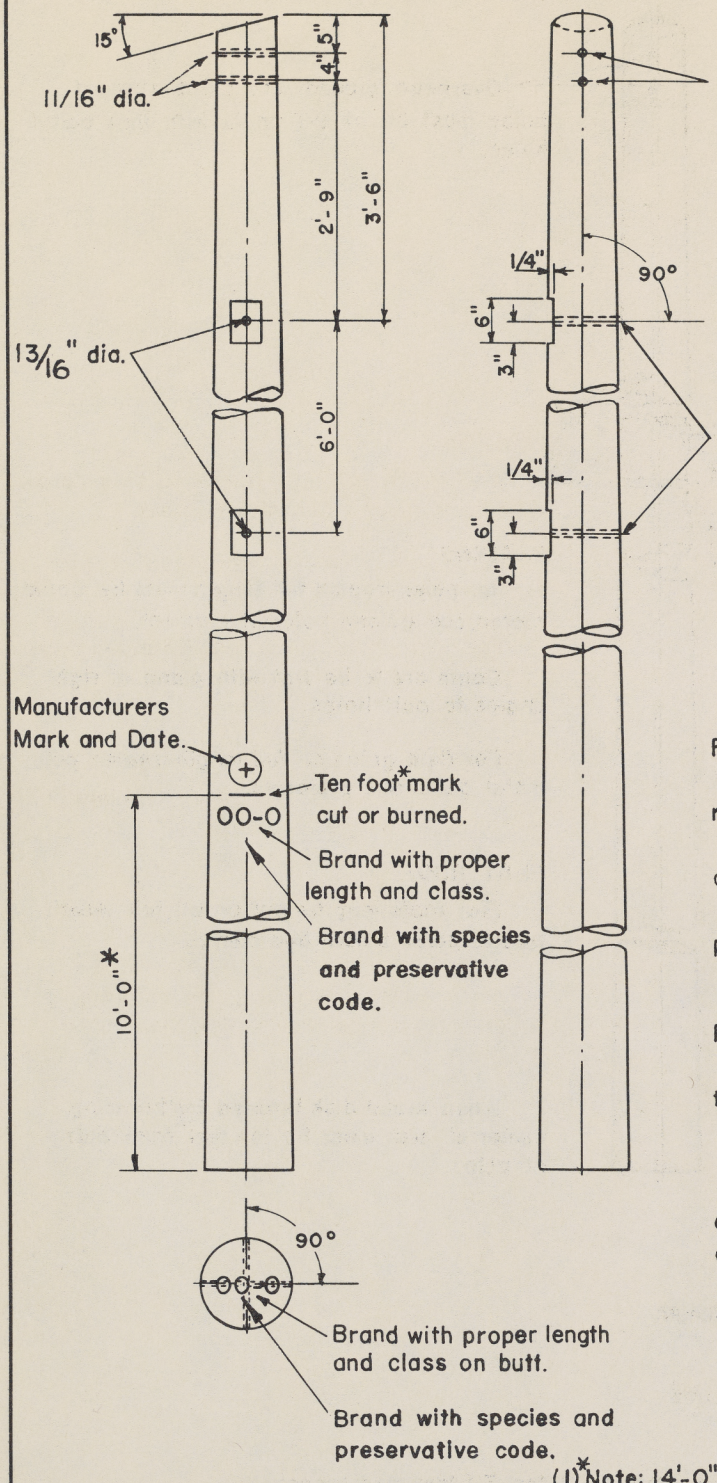
Flat roofs may be cut on all full-length treated poles before treatment.

When metal disk is used for branding, center of disk must be ten feet* from butt of pole.

(1) *Note: 14'-0" mark for poles 70 feet and longer.

TRANSMISSION LINE POLE FRAMING
FOR STRUCTURE TH-1

NO.	REVISION	DATE	Scale: 1/2"=1'-0"	Date: 11-49
1		7-53		TM-4A



FRAMING

All poles treated full length must be bored, roofed, and gained before treatment.

Gains are to be flat with plane at right angles to bolt hole.

For field gains on full length treated poles metal gains are preferred.

FLAT ROOF

Flat roofs may be cut on all full-length treated poles before treatment.

When metal disk is used for branding, center of disk must be ten feet* from butt of pole.

(1)*Note: 14'-0" mark for poles 70 feet and longer.

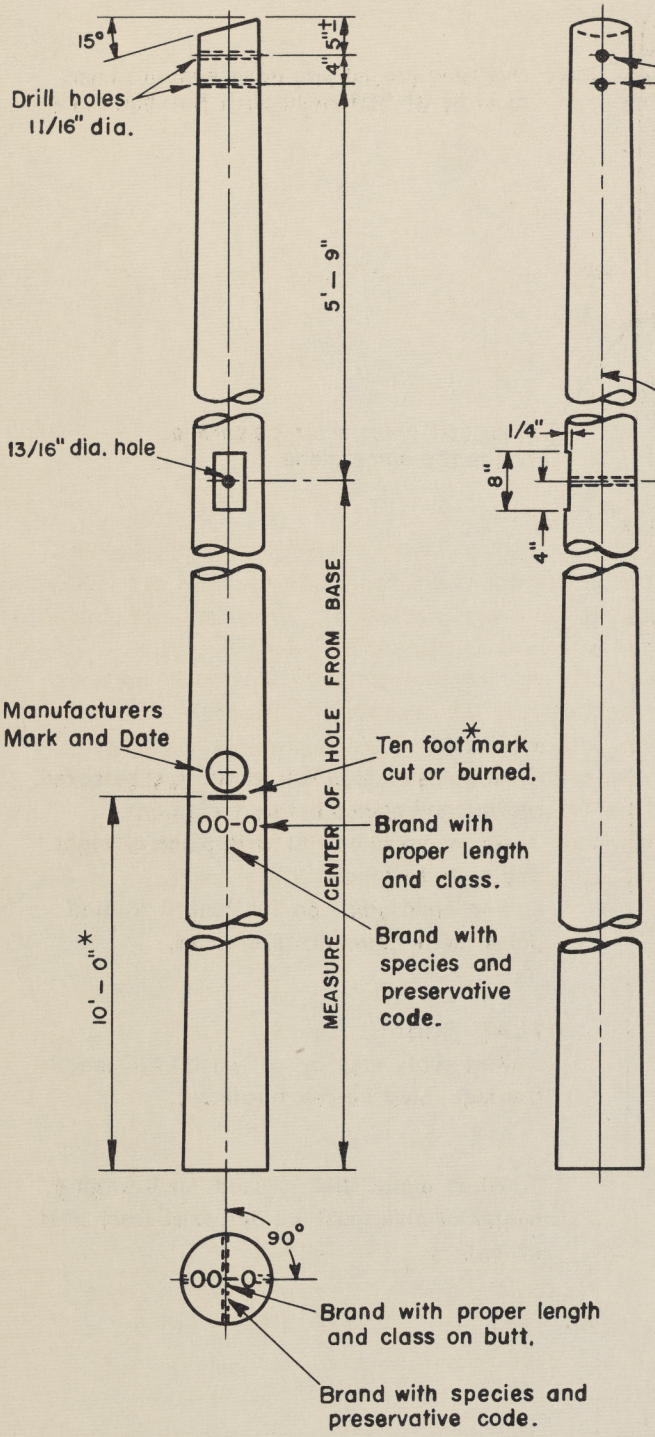
TRANSMISSION LINE POLE FRAMING
FOR STRUCTURE TS-1

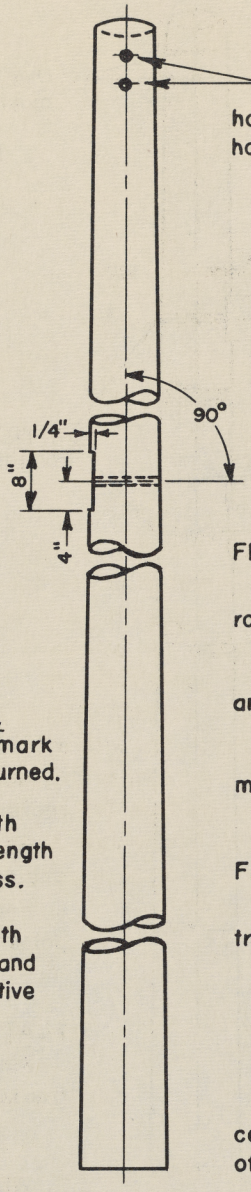
NO.	REVISION	DATE
1		7-53

Scale: 1/2"=1'-0"

Date: 11-49

TM-5





Overhead ground wire cable support holes must be at 90° angle with thru bolt holes.

FRAMING

All poles treated full length must be bored, roofed, and gained before treatment.

Gains are to be flat with plane at right angles to bolt holes.

For field gains on full length treated poles metal gains are preferred.

FLAT ROOF

Flat roofs may be cut on all full-length treated poles before treatment.

When metal disk is used for branding, center of disk must be ten feet* from butt of pole.

(1)*Note: 14' mark for poles 70 feet and longer.

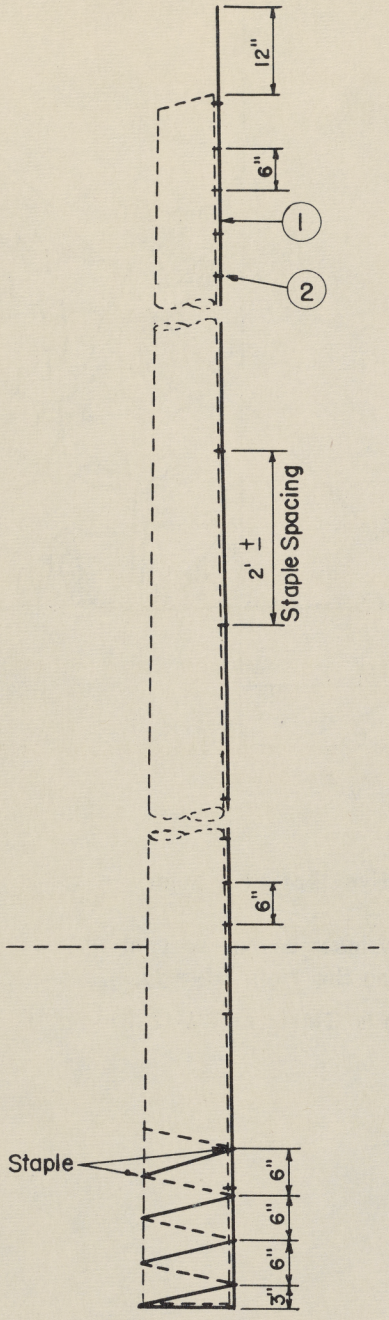
TRANSMISSION LINE POLE FRAMING
FOR STRUCTURES TH-1G AND TH-1A

NO.	REVISION	Date
1		7-53

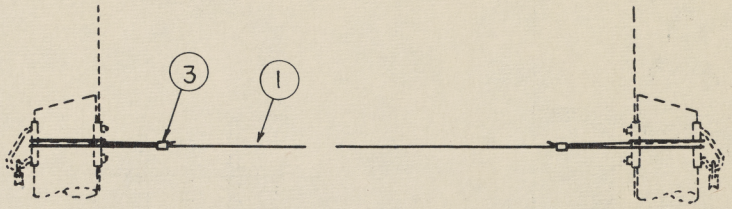
Scale: 1/2"=1'-0"

Date: 11-49

TM-5A



POLE GROUND
TM-9



TWO POLE TIE ASSEMBLY
TM-9A

NOTE

Staple downlead to pole leaving one foot projecting above pole. Carry downlead under bottom of pole and take four wraps back up pole with a staple at each wire crossing and on opposite side of pole.

Make one turn of downlead underneath washers around conductor support bolts and overhead ground wire support bolts as indicated on respective pole top assembly drawings.

On structures with crossarms staple downlead so that it does not come in contact with crossarms or through bolts, as indicated on respective pole top assembly drawings.

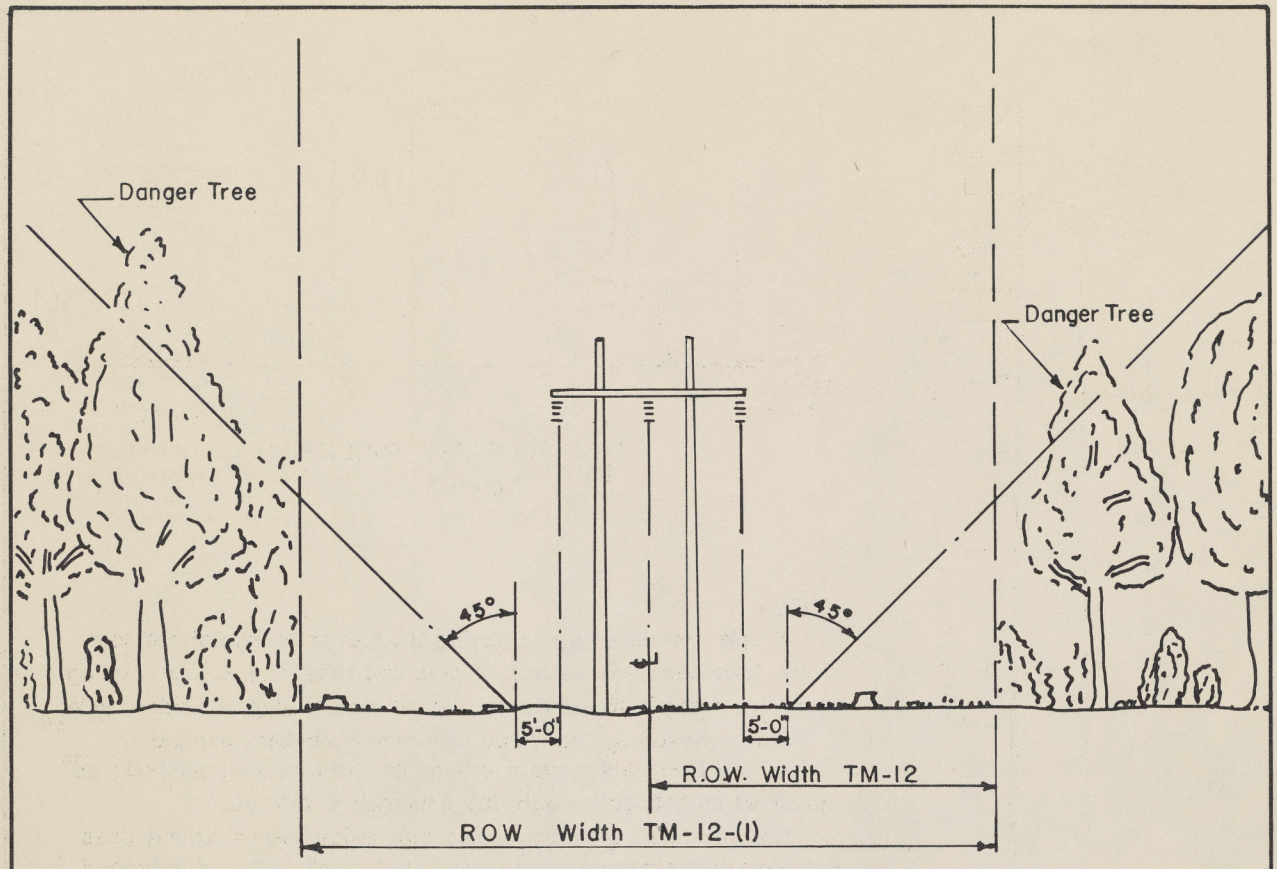
Staples on downlead shall be 2 feet apart, except for a distance of 8 feet above ground and 8 feet from top of pole where they shall be 6 inches apart.

LIST OF MATERIAL

DR'G REF.	REQUIRED TM-9	REQUIRED TM-9A	DESCRIPTION	ITEM
1	1	1	No.6 AWG. Solid S.D. Copper or Copperweld Wire	cj
2	*		1½" Copperweld or Galvanized Staples	al
3		2	Connectors	p

POLE GROUNDING ASSEMBLY

Scale: 1/2"=1'-0"		Date:
		TM-9, 9A



NOTE:

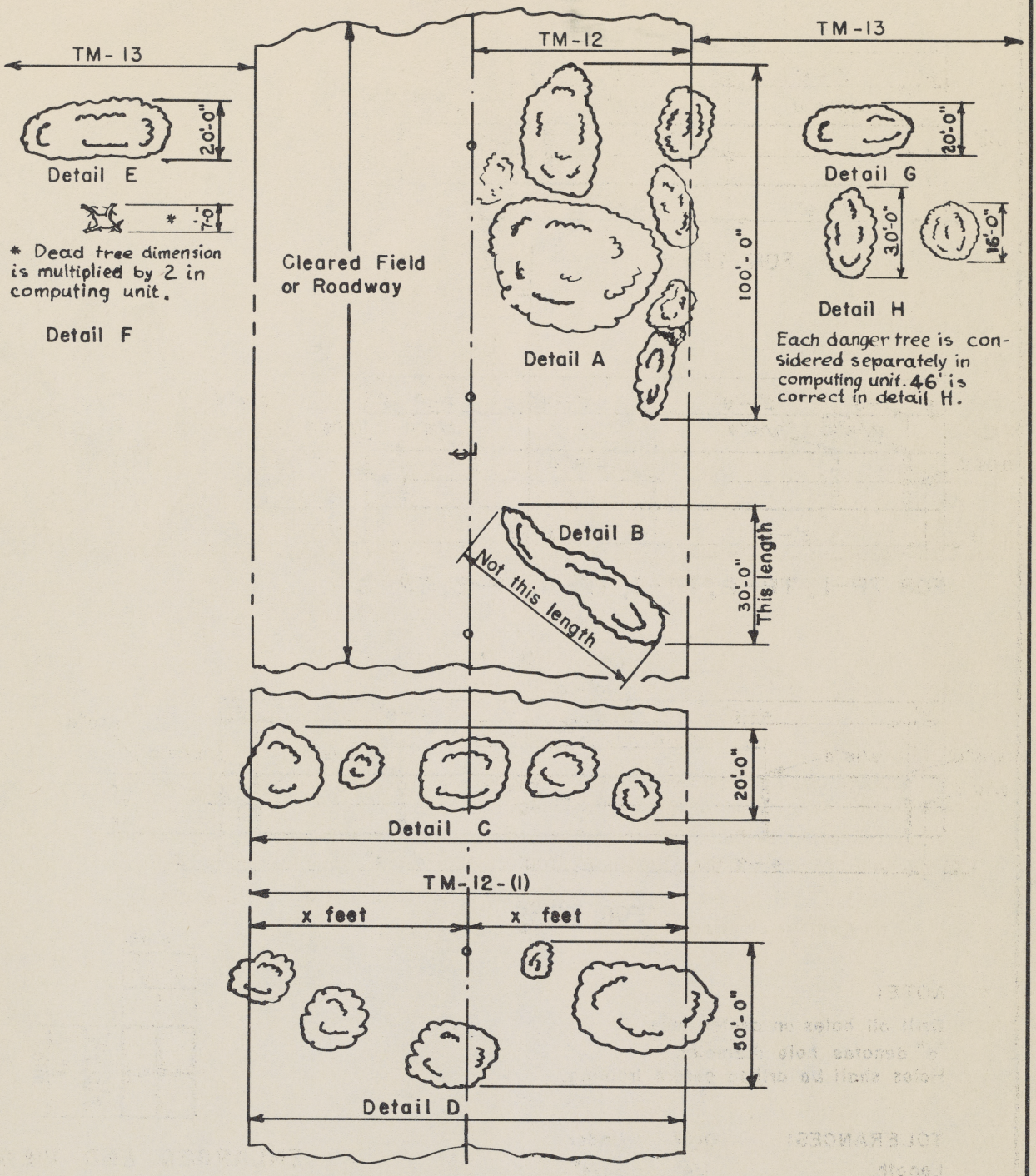
Cut or top all danger trees (trees which would reach within five feet of a point underneath the outside conductor in falling).

As directed by the engineer, portions of the right-of-way must be cut so that stumps will not prevent the passage of tractors and trucks along the right-of-way.

The bid unit for clearing right-of-way of specified width is TM-12 or TM-12-(1)
The unit for clearing danger trees is TM-13.

TRANSMISSION LINE
CLEARING RIGHT-OF-WAY GUIDE

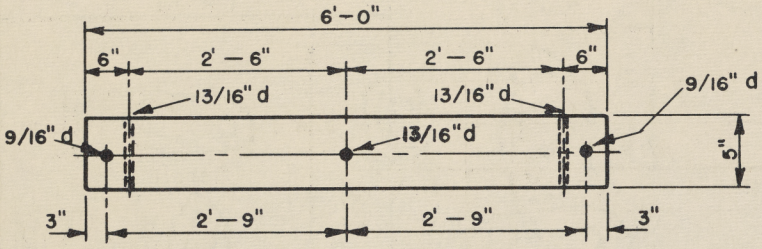
Scale: None		Date:
		TM-12,12-1,13



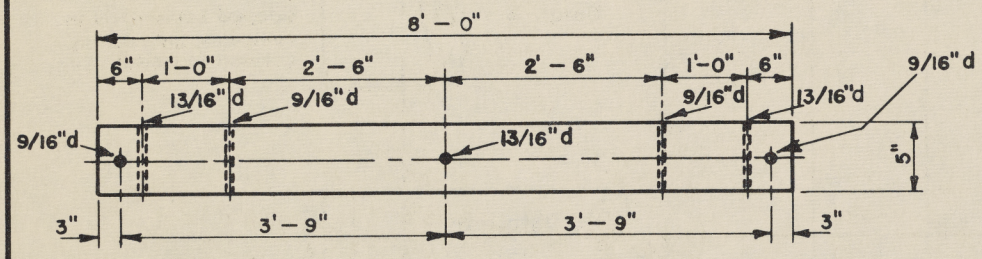
GUIDE

MEASURING RIGHT OF WAY CLEARING UNITS

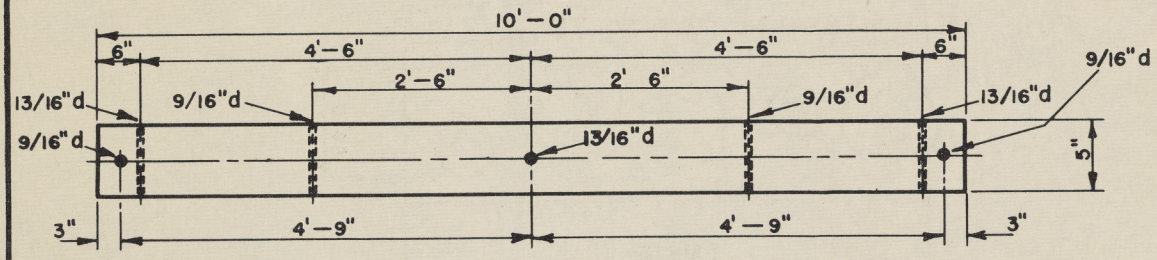
Scale: None		Date: 11-20-50
		TM-12-2A



FOR TP-5



FOR TP-1, TP-2, TP-3, TP-4, TP-5, TP-6

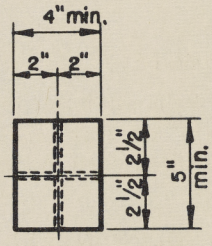


FOR TP-6

NOTE:

Drill all holes on center lines.
"d" denotes hole diameter.
Holes shall be drilled before treating.

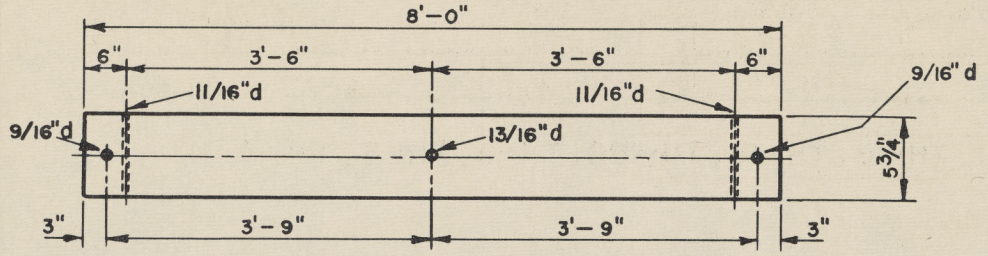
TOLERANCES:	Over	Under
Length	1/4"	1/4"
Cross Section	1/8"	1/8" (1)



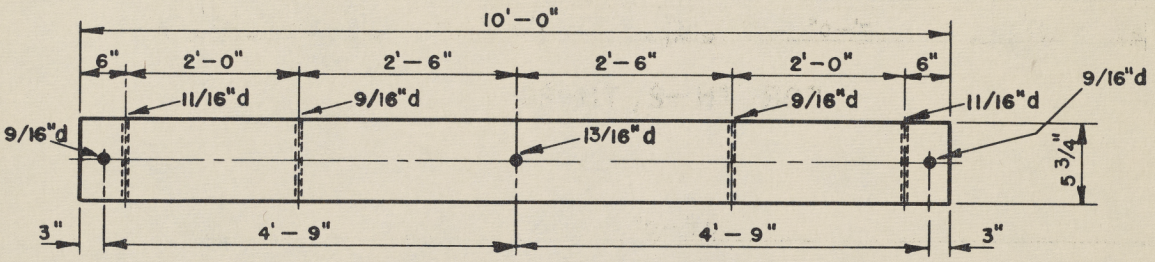
ENLARGED END VIEW
Surface Finished Dimensions

CROSSARM DRILLING GUIDE
FOR PIN TYPE STRUCTURES

NO.	REVISION	DATE	Scale: None	Date: 11-49
1		7-53		TM-20



FOR TS-1, TS-1B, TS-2, TS-6

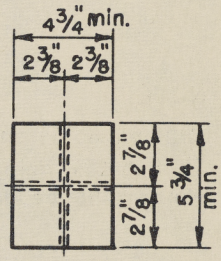


FOR TS-1, TS-1B, TS-2, TS-6, TS-7

NOTE:

Drill all holes on center lines.
"d" denotes hole diameter.
Holes shall be drilled before treating.

TOLERANCES:	Over	Under
Length	1/4"	1/4"
Cross Section	1/8"	1/8"(1)



ENLARGED END VIEW
Surface Finished Dimensions

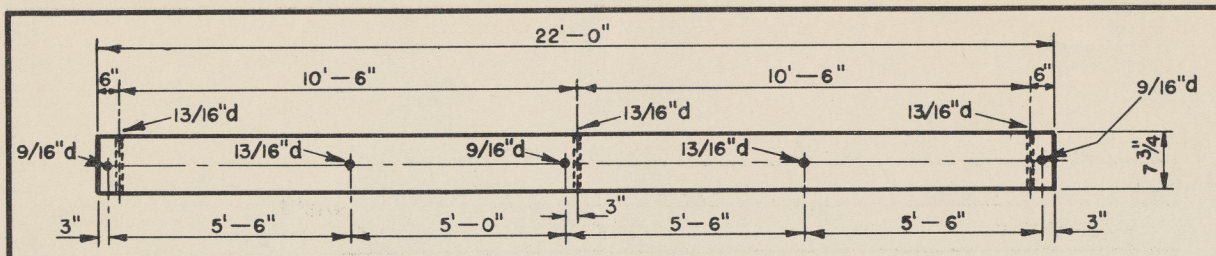
CROSSARM DRILLING GUIDE
FOR SINGLE POLE SUSPENSION STRUCTURES

NO	REVISION	DATE
1		7-53

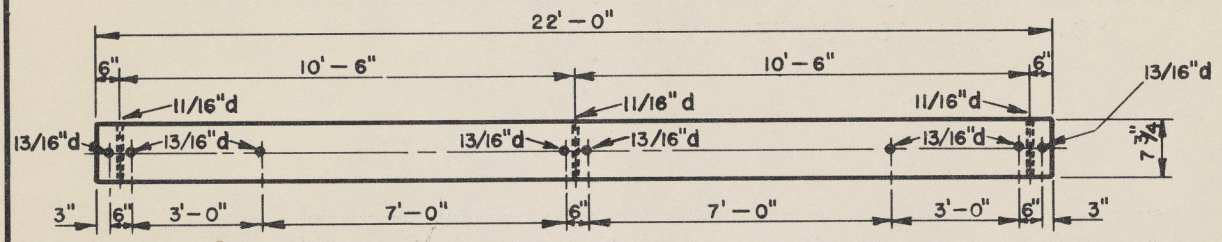
Scale: None

Date: 11-49

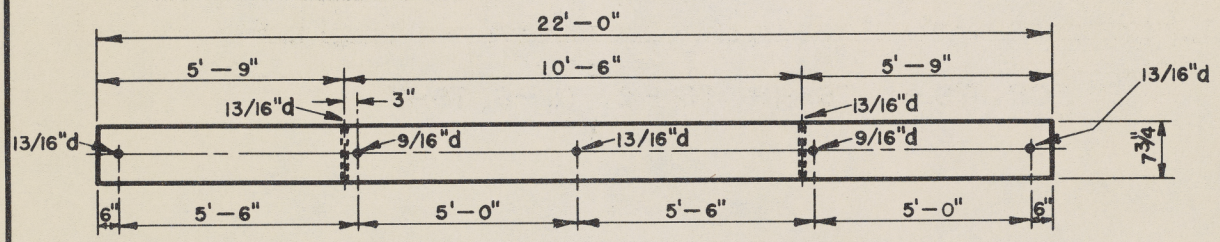
TM-21



FOR TH-1, TH-1G, TH-1B, TH-1BG, TH-6, TH-3, TH-4



FOR TH-2, TH-2G

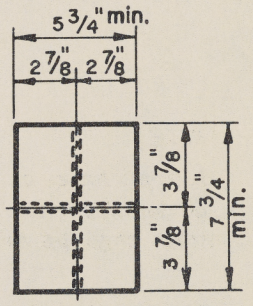


FOR TH-5

NOTE:

Drill all holes on center lines.
"d" denotes hole diameter.
Holes shall be drilled before treating.

TOLERANCES:	Over	Under
Length	1/4"	1/4"
Cross Section	1/8"	1/8" (1)



ENLARGED END VIEW
Surface Finished Dimensions

CROSSARM DRILLING GUIDE

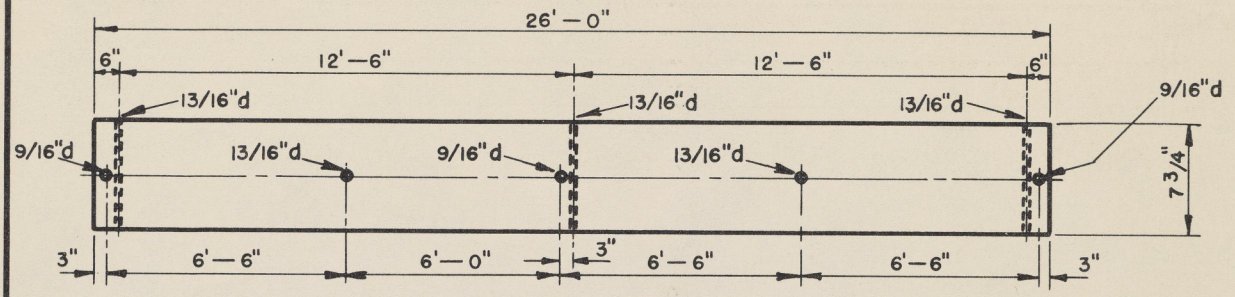
FOR H-FRAME STRUCTURES WITH 10'-6" CONDUCTOR SPACING

No.	Revision	Date
1		7-53

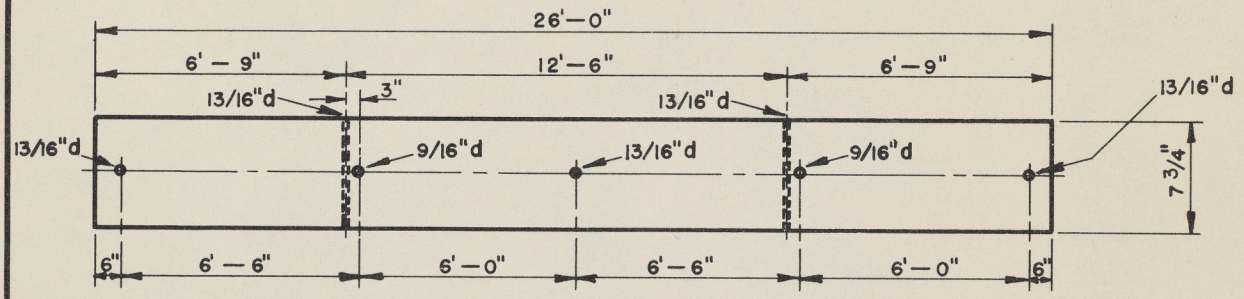
Scale: None

Date: 11-49

TM-22



FOR TH-1A, TH-2A, TH-3A, TH-4A

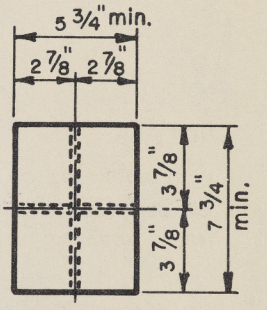


FOR TH-5A

NOTE:

Drill all holes on center lines.
"d" denotes hole diameter.
Holes shall be drilled before treating.

TOLERANCES:	Over	Under
Length	1/4"	1/4"
Cross Section	1/8"	1/8" (1)



ENLARGED END VIEW
Surface Finished Dimensions

CROSSARM DRILLING GUIDE

FOR H-FRAME STRUCTURES WITH 12'-6" CONDUCTOR SPACING

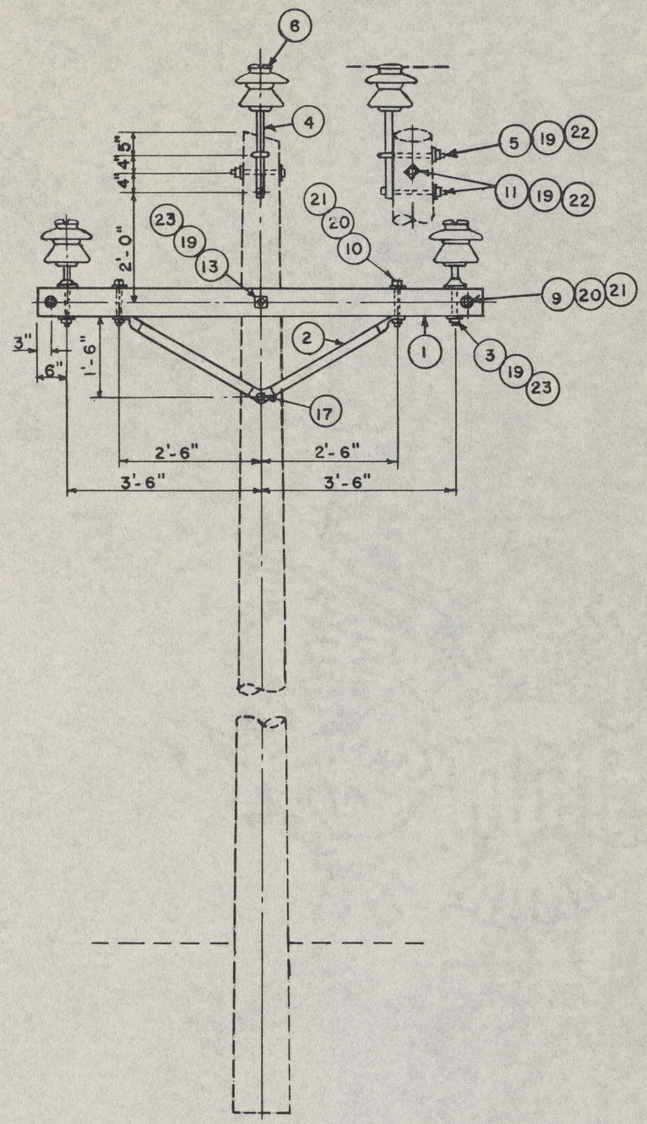
No.	Revision	Date
1		7-53

Scale: None

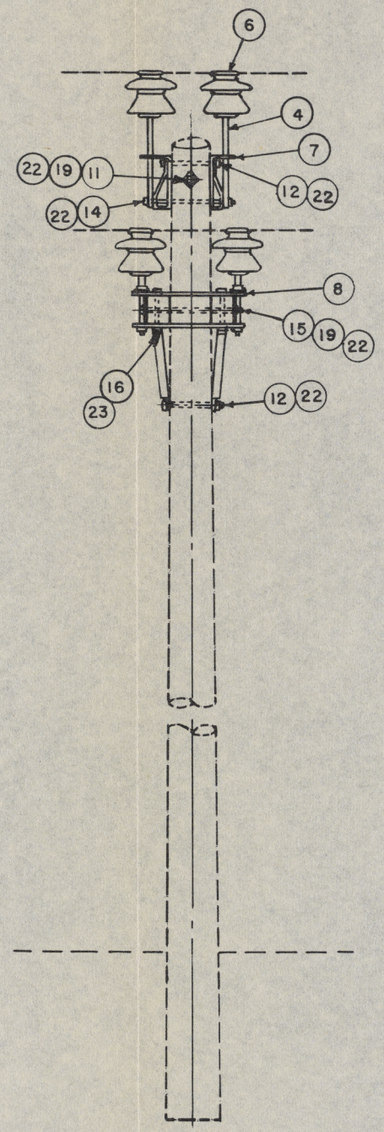
Date: 11-49

TM-23

☆ U. S. GOVERNMENT PRINTING OFFICE : 1953 O - 267825



TYPE TP-1
SINGLE ARM



TYPE TP-2
DOUBLE ARM

LIST OF MATERIAL

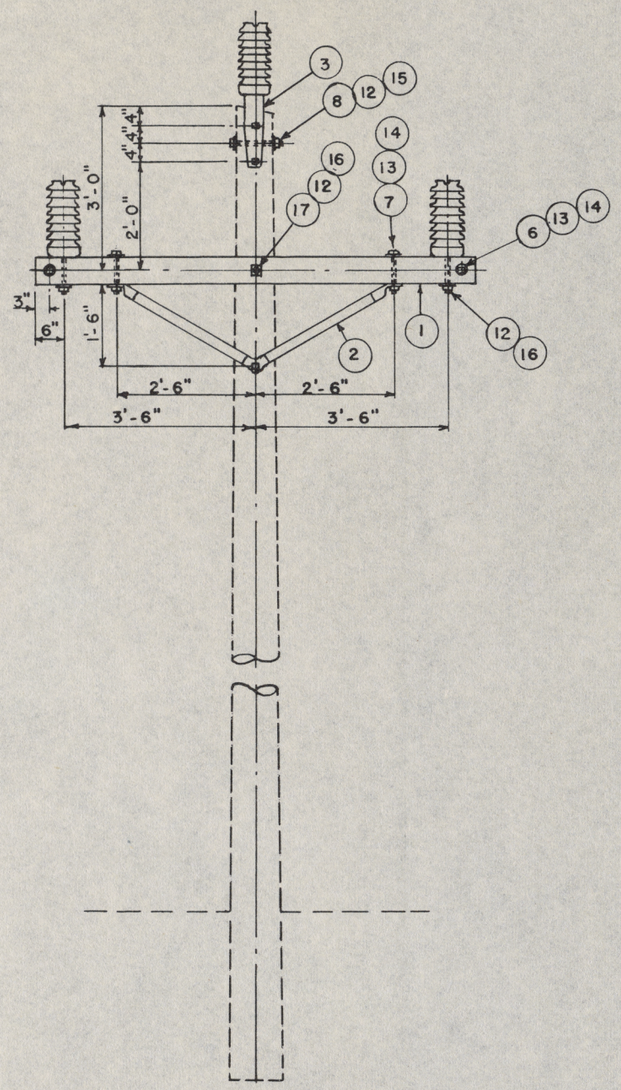
DRG. REF.	REQ'D P-1	REQ'D P-2	DESCRIPTION	ITEM
1	1	2	4"x 5"x 8'-0" Wood Crossarm	g
2	1	2	60" Wood Crossarm Brace	cu
3	2	4	10" Insulator Pin, Lead Thread	f
4	1	2	Pole Top Pin	b
5	1		5/8"x 12" Special Eye Bolt for Pole Top Pin	dx
6	3	6	Pin Type Insulator	a
7		2	Pole Top Bracket	cs
8		4	Double Arming Plate	ct
9	2	4	1/2"x 6" Machine Bolt	c
10	2	4	1/2"x 7" Machine Bolt	c
11	2	1	5/8"x 12" Machine Bolt	c
12		2	5/8"x 14" Machine Bolt	c
13	1		3/4"x 16" Machine Bolt	c
14		1	5/8"x 18" Machine Bolt	c
15		1	3/4"x 20" Machine Bolt	c
16		4	3/4"x 8" Machine Bolt	c
* 17	1		5/8"x 5" Lag Screw or 5/8"x12" Mach. Bolt & Locknut	j
18				
19	8	4	2 1/4"x 2 1/4"x 3/16" Galv. Sq. Washer, 13/16" Hole	d
20	6	12	1 3/8" Galv. Round Washer, 9/16" Hole	d
21	4	8	Locknuts for 1/2" Bolt	ek
22	3	4	Locknuts for 5/8" Bolt	ek
23	3	9	Locknuts for 3/4" Bolt	ek

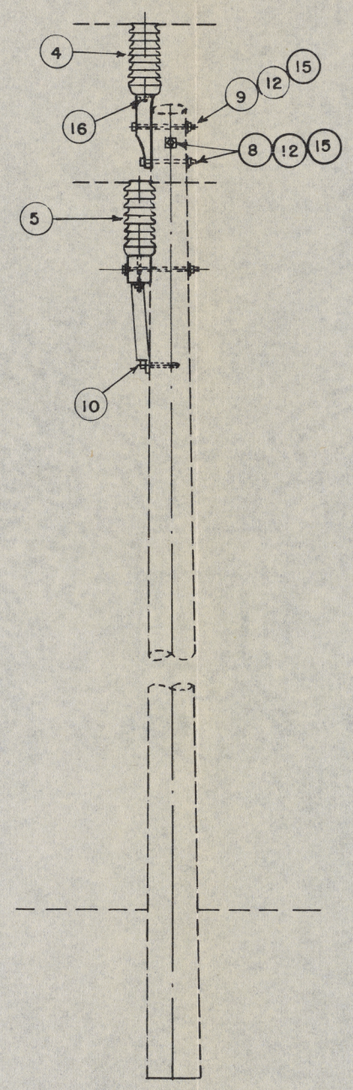
* Strike out item which does not apply.

TRANSMISSION LINE TANGENT STRUCTURES
_____ KV. PIN TYPE
(46 KV. MAXIMUM)

Scale: 3/8"=1'-0"		Date:
		TP-1, TP-2

267825 O - 53 (Fol. TM - 23) No. 1





* Strike out item which does not apply.

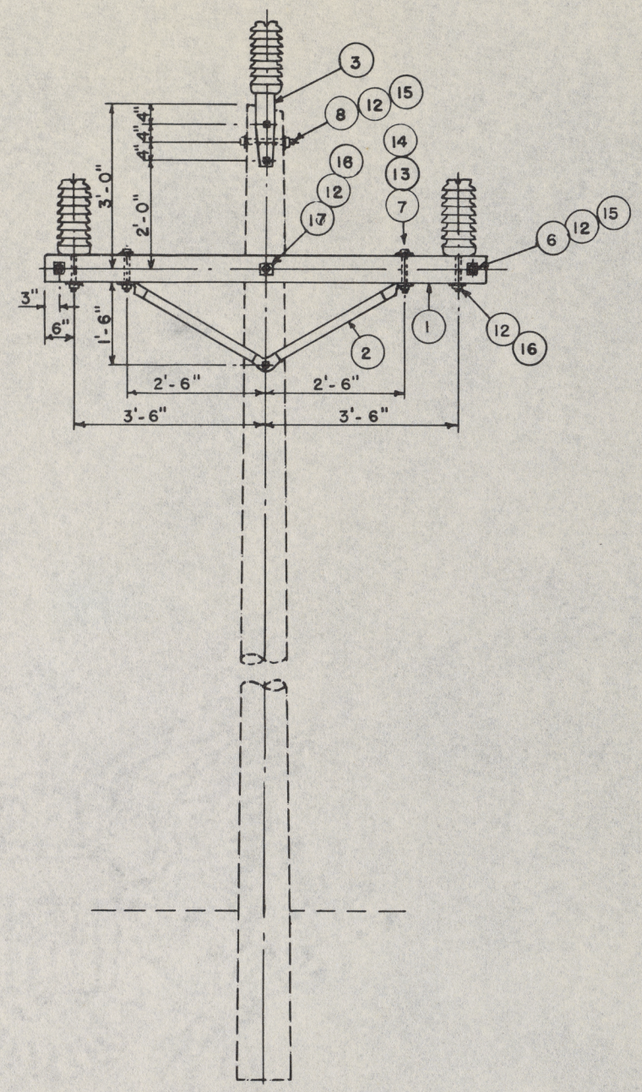
LIST OF MATERIAL

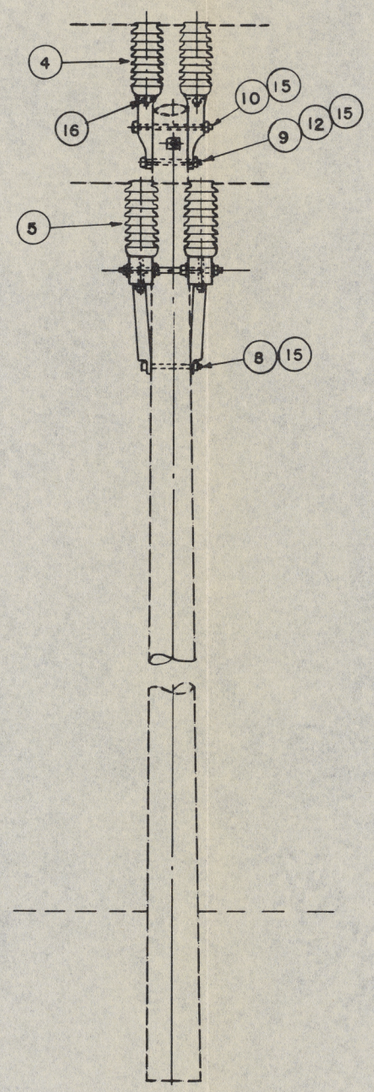
DRG. REF.	REQ'D	DESCRIPTION	ITEM
1	1	4"x5"x 8'-0" Wood Crossarm	g
2	1	60" Wood Crossarm Brace	cu
3	1	Pole Top Fitting for Post Insulator	eb
4	1	Post Type Insulator, Short Stud	ea
5	2	Post Type Insulator, Long Stud	ea
6	2	1/2"x 6" Machine Bolt	c
7	2	1/2"x 7" Machine Bolt	c
8	2	5/8"x 12" Machine Bolt	c
9	1	5/8"x 16" Machine Bolt	c
* 10	1	5/8"x 5" Lag Screw or 5/8"x12" Mach.Bolt & Locknut	j
11			
12	8	2 1/4"x 2 1/4"x 3/16" Galv. Sq. Washer, 13/16" Hole	d
13	6	1 3/8" Galv. Round Washer, 9/16" Hole	d
14	4	Locknuts for 1/2" Bolt	ek
15	3	Locknuts for 5/8" Bolt	ek
16	4	Locknuts for 3/4" Bolt	ek
17	1	3/4"x 16" Machine Bolt	c

TRANSMISSION LINE TANGENT STRUCTURE
_____ KV. POST TYPE
(46 KV. MAXIMUM)

Scale: 3/8"=1'-0"		Date:
		TP-3

267825 O - 53 (Fol. TM - 23) No. 2





LIST OF MATERIAL

DRG. REF.	REQ'D	DESCRIPTION	ITEM
1	2	4"x5"x8'-0" Wood Crossarm	g
2	2	60" Wood Crossarm Brace	cu
3	2	Pole Top Fitting for Post Insulator	eb
4	2	Post Type Insulator, Short Stud	ea
5	4	Post Type Insulator, Long Stud	ea
6	2	5/8"x 22" Double Arming Bolt	n
7	4	1/2"x 7" Machine Bolt	c
8	2	5/8"x12" Machine Bolt	c
9	1	5/8"x14" Machine Bolt	c
10	1	5/8"x 20" Machine Bolt	c
11			
12	16	2 1/4"x 2 1/4"x 3/16" Galv. Sq. Washer, 13/16" Hole	d
13	4	1 3/8" Galv. Round Washer, 9/16" Hole	d
14	4	Locknuts for 1/2" Bolt	ek
15	8	Locknuts for 5/8" Bolt	ek
16	7	Locknuts for 3/4" Bolt	ek
17	1	3/4"x20" Machine Bolt	c

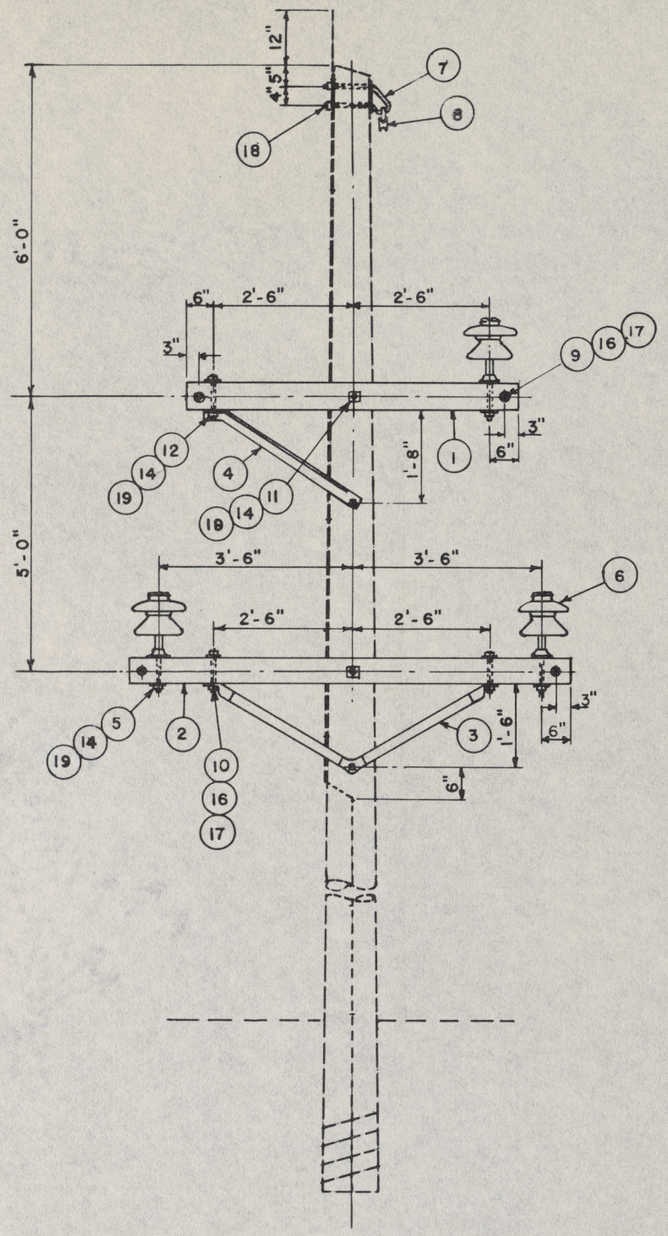
TRANSMISSION LINE TANGENT STRUCTURE

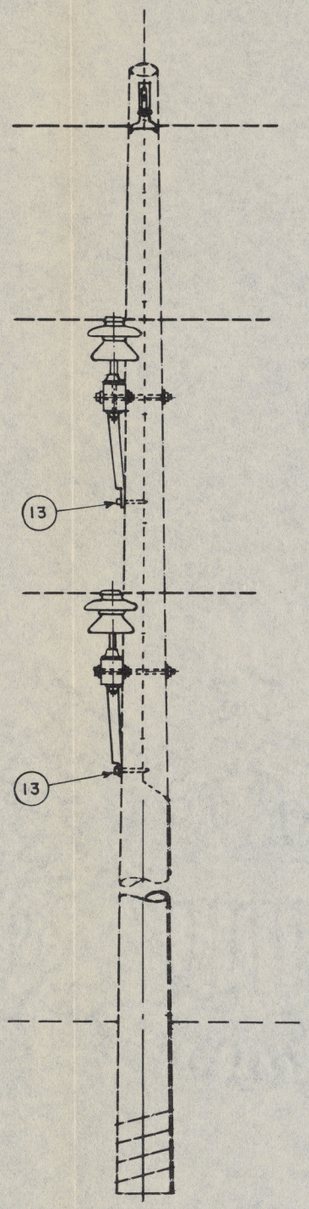
_____KV. POST TYPE

(46 KV. MAXIMUM)

Scale: 3/8"=1'-0"		Date:
		TP-4

267825 O - 53 (Fol. TM - 23) No. 3





NOTE:

Make one turn of downlead underneath washer around overhead ground wire support bolts and staple to pole so that it does not come in contact with crossarms or through bolts.

* Strike out item which does not apply.

LIST OF MATERIAL

DRG. REF.	REQ'D	DESCRIPTION	ITEM
1	1	4"x 5"x 6'-0" Wood Crossarm	g
2	1	4"x 5"x 8'-0" Wood Crossarm	g
3	1	60" Wood Crossarm Brace	cu
4	1	36" Alley Arm Brace	em
5	3	10" Insulator Pin, Lead Thread	f
6	3	Pin Type Insulator	a
7	1	Ground Wire Cable Support	ed
8	1	Ground Wire Suspension Clamp	m
9	4	1/2"x 6" Machine Bolt	c
10	2	1/2"x 7" Machine Bolt	c
11	2	3/4"x 18" Machine Bolt	c
12	1	3/4"x 8" Machine Bolt	c
* 13	2	5/8"x 5" Lag Screw or 5/8"x12"Mach. Bolt & Locknut	j
14	8	2 1/4"x 2 1/4"x 3/16" Galv. Sq. Washer, 13/16" Hole	d
15			
16	10	1 3/8" Galv. Round Washer, 9/16" Hole	d
17	6	Locknuts for 1/2" Bolt	ek
18	2	Locknuts for 5/8" Bolt	ek
19	6	Locknuts for 3/4" Bolt	ek

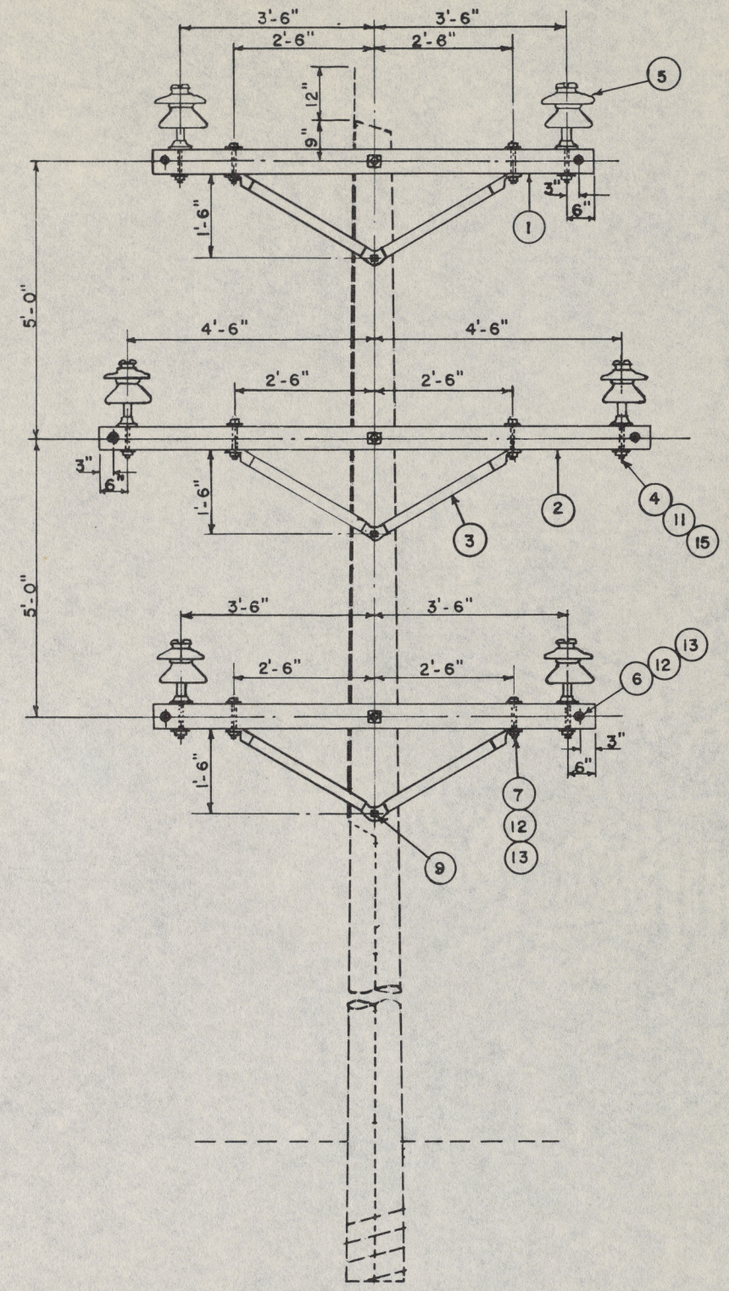
TRANSSMISSION LINE TANGENT STRUCTURE

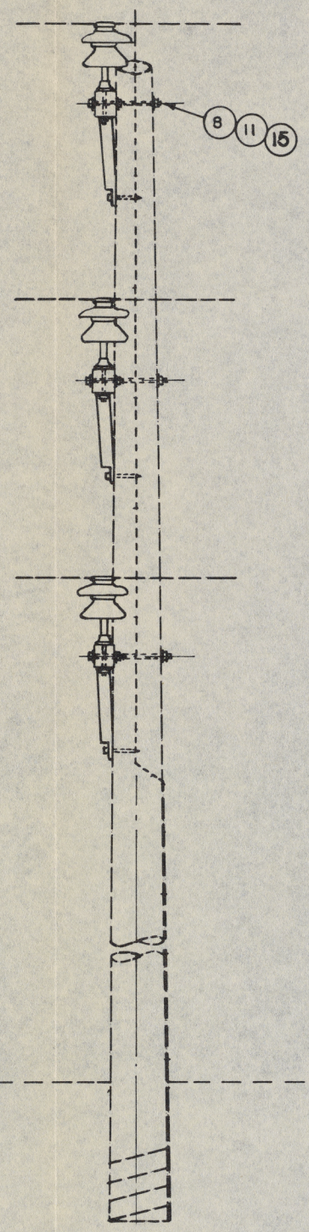
_____KV. PIN TYPE WITH OVERHEAD GROUND

(46 KV. MAXIMUM)

Scale: 3/8"=1'-0"		Date:
		TP-5

267825 O - 53 (Fol. TM - 23) No. 4





NOTE:
Staple downlead to pole so that it does not come in contact with crossarms or through bolts.

*Strike out items which do not apply.

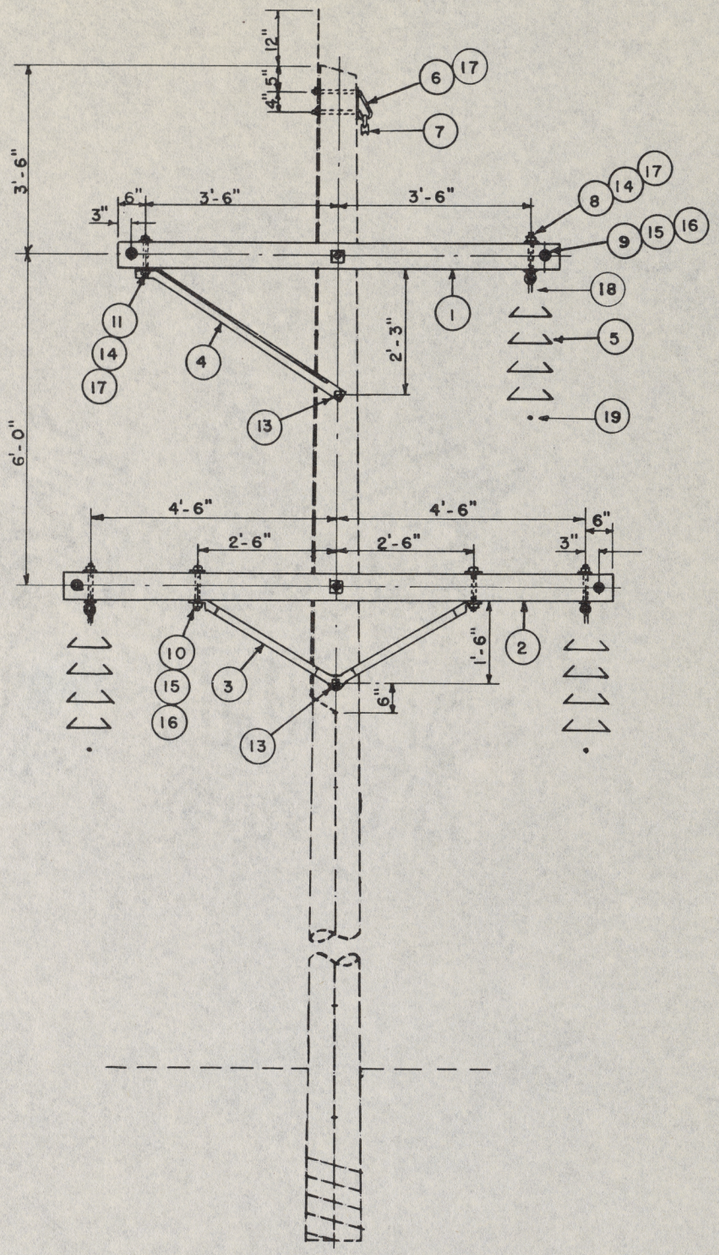
LIST OF MATERIAL

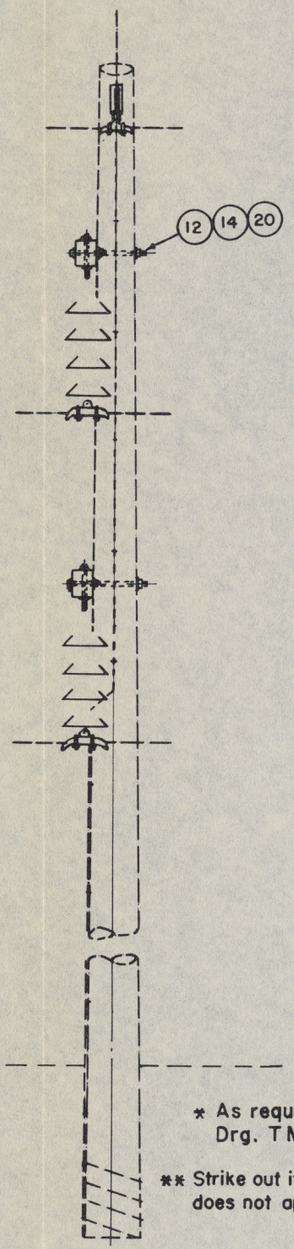
DRG. REF.	REQ'D	DESCRIPTION	ITEM
1	2	4"x 5"x 8'-0" Wood Crossarm	g
2	1	4"x 5"x 10'-0" Wood Crossarm	g
3	3	60" Wood Crossarm Brace	cu
4	6	10" Insulator Pin, Lead Thread	f
5	6	Pin Type Insulator	a
6	6	1/2"x 6" Machine Bolt	c
7	6	1/2"x 7" Machine Bolt	c
8	3	3/4"x 18" Machine Bolt	c
* 9	3	5/8"x 5" Lag Screw or 5/8"x 12" Mach. Bolt & Locknut	j
10			
11	12	2 1/4"x 2 1/4"x 3/16" Galv. Sq. Washer, 13/16" Hole	d
12	18	1 3/8" Galv. Round Washer, 9/16" Hole	d
13	12	Locknuts for 1/2" Bolt	ek
14			
15	9	Locknuts for 3/4" Bolt	ek

TRANSMISSION LINE TANGENT STRUCTURE
____ KV. PIN TYPE - DOUBLE CIRCUIT
(46 KV. MAXIMUM)

Scale: 3/8"=1'-0"		Date:
		TP-6

267825 O - 53 (Fol. TM - 23) No. 5





NOTE:
Make one turn of downlead underneath washer around overhead ground wire support bolts and staple to pole so that it does not come in contact with crossarms or through bolts.

* As required. See Drg. TM-1

** Strike out item which does not apply.

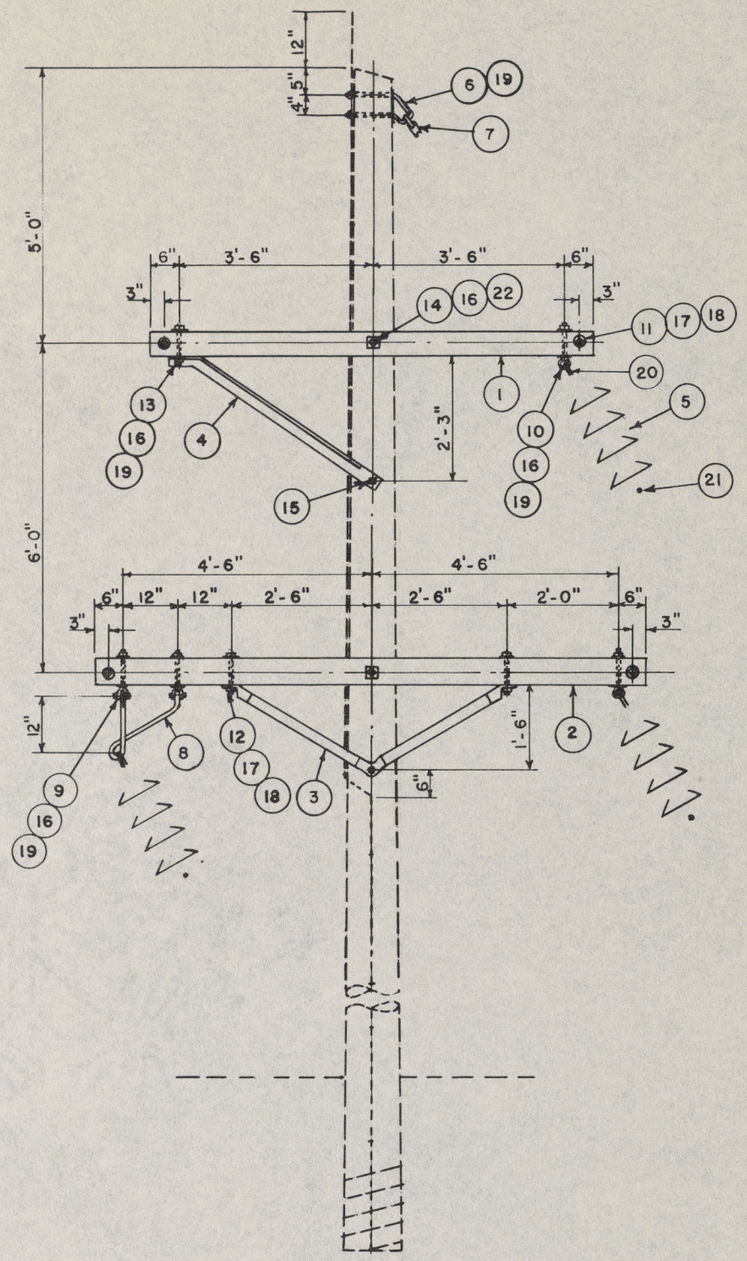
LIST OF MATERIAL

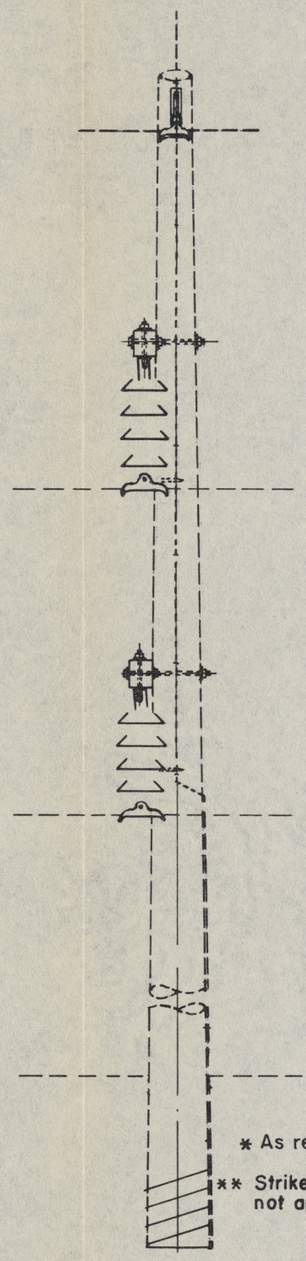
	DRG. REF.	REQ'D	DESCRIPTION	ITEM
	1	1	4 3/4"x5 3/4"x8'-0" Wood Crossarm	g
	2	1	4 3/4"x5 3/4"x10'-0" Wood Crossarm	g
	3	1	60" Wood Crossarm Brace	cu
	4	1	48" Alley Arm Brace	em
	5	*	5 3/4"x10" Suspension Insulator	k
	6	1	Ground Wire Cable Support	ed
	7	1	Ground Wire Suspension Clamp	m
	8	3	5/8"x8" Eye Bolt	o
	9	4	1/2"x7" Machine Bolt	c
	10	2	1/2"x8" Machine Bolt	c
	11	1	5/8"x8" Machine Bolt	c
	12	2	3/4"x18" Machine Bolt	c
**	13	2	5/8"x5" Lag Screw or 5/8"x12" Mach. Bolt & Locknut	j
	14	11	2 1/4"x2 1/4"x3/16" Galv. Sq. Washer, 13/16" Hole	d
	15	10	1 3/8" Galv. Round Washer, 9/16" Hole	d
	16	6	Locknuts for 1/2" Bolt	ek
	17	6	Locknuts for 5/8" Bolt	ek
	18	3	Suspension Hook	eh
	19	3	Suspension Clamp and Connecting Piece	ei
	20	2	Locknuts for 3/4" Bolts	ek

TRANSMISSION LINE TANGENT STRUCTURE
____ KV. SINGLE POLE SUSPENSION
(69 KV. MAXIMUM)

Scale: 3/8"=1'-0"		Date:
		TS-1

267825 O - 53 (Fol. TM - 23) No. 6





**

* As required. See Drg.TM-1

** Strike out item which does not apply.

NOTE:

Make one turn of downlead underneath washer around overhead ground wire support bolts, and staple to pole so that it does not come in contact with crossarms or through bolts.

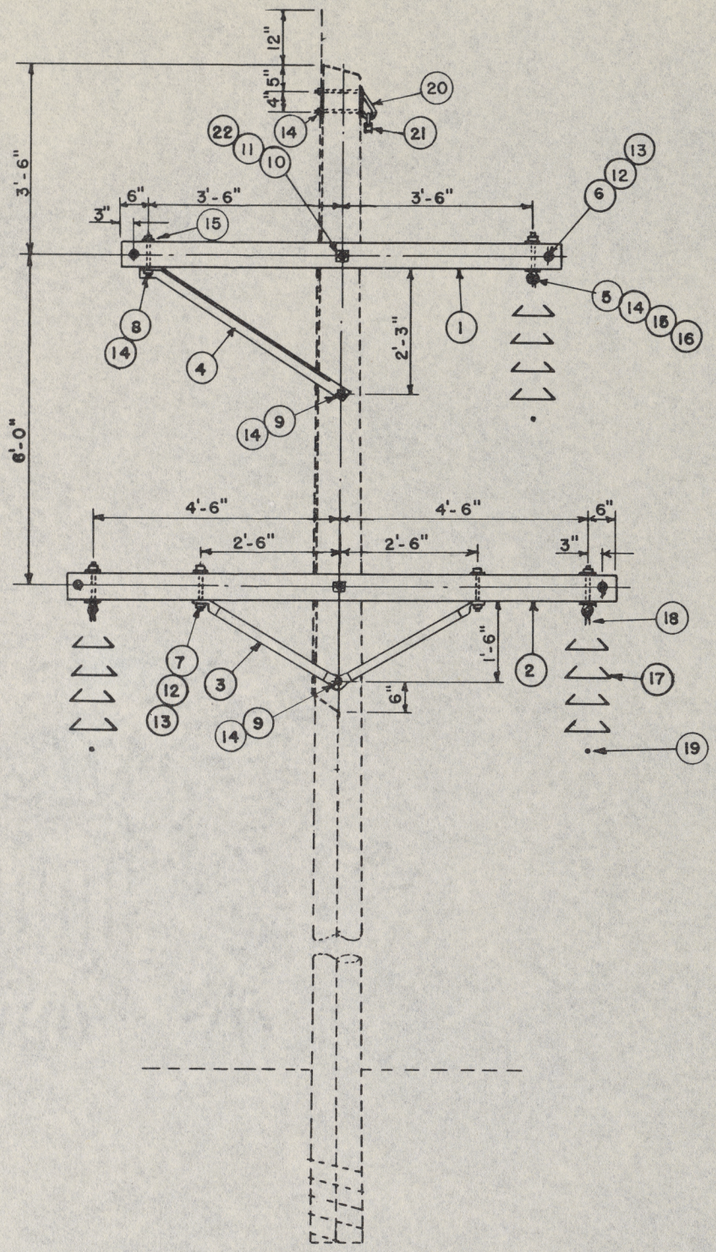
LIST OF MATERIAL

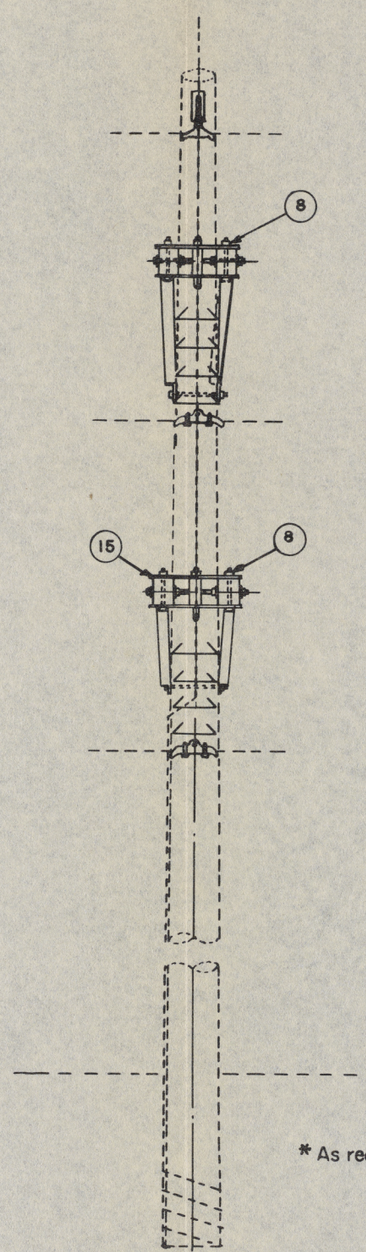
DRG. REF.	REQ'D	DESCRIPTION	ITEM
1	1	4 3/4"x 5 3/4"x 8'-0" Wood Crossarm	g
2	1	4 3/4"x5 3/4"x10'-0" Wood Crossarm	g
3	1	60" Wood Crossarm Brace	cu
4	1	48" Alley Arm Brace	em
5	*	5 3/4"x 10" Suspension Insulator	k
6	1	Ground Wire Cable Support	ed
7	1	Ground Wire Suspension Clamp	m
8	1	3/4" Angle Bracket	cr
9	2	5/8"x 8" Clevis Bolt	ef
10	2	5/8"x 8" Eye Bolt	o
11	4	1/2"x 7" Machine Bolt	c
12	2	1/2"x 8" Machine Bolt	c
13	1	5/8"x 8" Machine Bolt	c
14	2	3/4"x18"Machine Bolt	c
15	2	5/8"x 5" Lag Screw or 5/8"x 12" Mach. Bolt & Locknut	j
16	13	2 1/4"x 2 1/4"x 3/16" Galv. Sq. Washer, 13/16" Hole	d
17	10	1 3/8" Galv. Round Washer, 9/16" Hole	d
18	6	Locknuts for 1/2" Bolts	ek
19	7	Locknuts for 5/8" Bolts	ek
20	3	Suspension Hook	eh
21	3	Suspension Clamp and Connecting Piece	ei
22	2	Locknuts for 3/4" Bolts	ek

TRANSMISSION LINE SMALL ANGLE STRUCTURE
_____ KV. SINGLE POLE SUSPENSION
(69 KV. MAXIMUM)

Scale: 3/8"=1'-0"		Date:
		TS-1B

267825 O - 53 (Fol. TM - 23) No. 7





* As required. See Drg. TM-1

NOTE

Make one turn of downlead underneath washer around overhead ground wire support bolts, and staple to pole so that it does not come in contact with crossarms or through bolts.

LIST OF MATERIAL

DR'G REF.	REQ'D	DESCRIPTION	ITEM
1	2	4 3/4"x 5 3/4"x 8'-0" Wood Crossarm	g
2	2	4 3/4"x 5 3/4"x10'-0" Wood Crossarm	g
3	2	60" Wood Crossarm Brace	cu
4	2	48" Alley Arm Brace	em
5	3	5/8"x 8" Eye Bolt	o
6	8	1/2"x 6" Machine Bolt	c
7	4	1/2"x 8" Machine Bolt	c
8	8	5/8"x8" Machine Bolt	c
9	2	5/8"x 12" Machine Bolt	c
10	2	3/4"x24"Machine Bolt	c
11	4	2 1/4"x 2 1/4"x 3/16" Galv. Sq. Washer, 13/16" Hole	d
12	20	1 3/8" Galv. Round Washer, 9/16" Hole	d
13	12	Locknuts for 1/2" Bolt	ek
14	18	Locknuts for 5/8" Bolt	ek
15	7	1/4"x 4"x17" Double Arming Plate	ct
16	3	3/4"x 5 3/4" Pipe Spacer	
17	*	5 3/4"x 10" Suspension Insulator	k
18	3	Suspension Hook	eh
19	3	Suspension Clamp and Connecting Piece	ei
20	1	Overhead Ground Wire Cable Support	ed
21	1	Ground Wire Suspension Clamp	m
22	2	Locknuts for 3/4" Bolt	ek

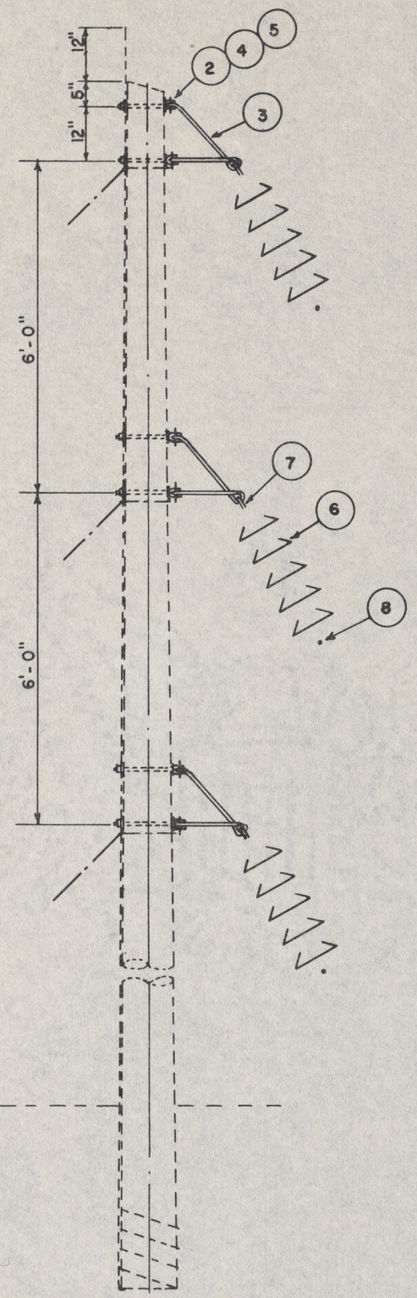
TRANSSMISSION LINE TANGENT STRUCTURE

___ KV. SINGLE POLE SUSPENSION- DOUBLE ARM

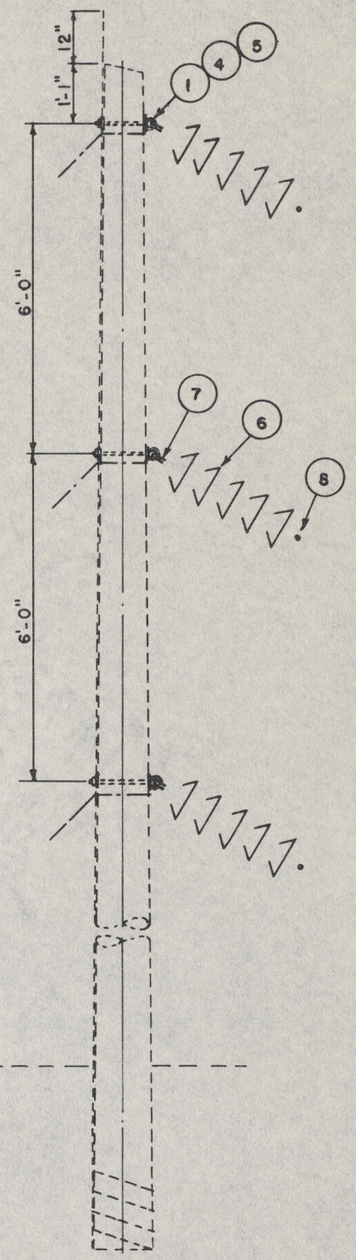
(69 KV. MAXIMUM)

Scale: 3/8"=1'-0"		Date:
		TS-2

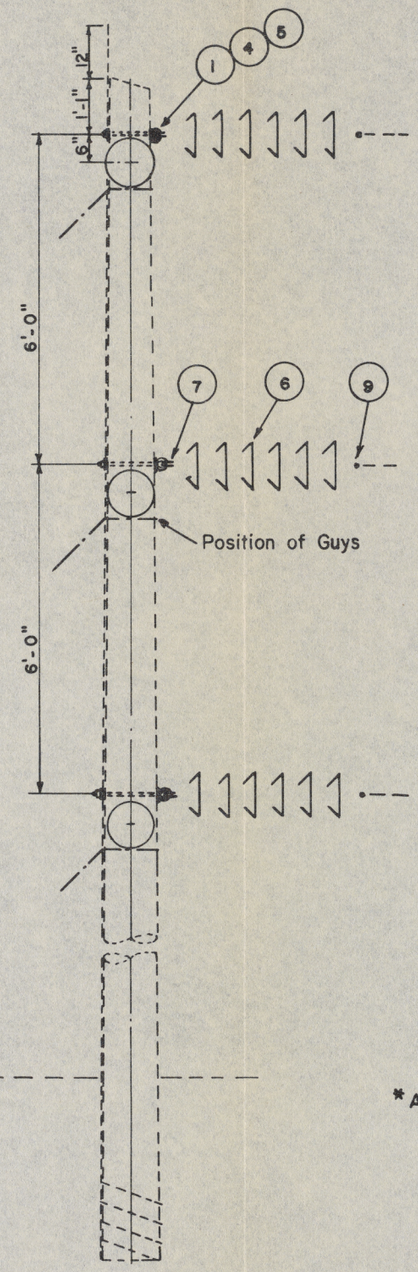
267825 O - 53 (Fol. TM - 23) No. 8



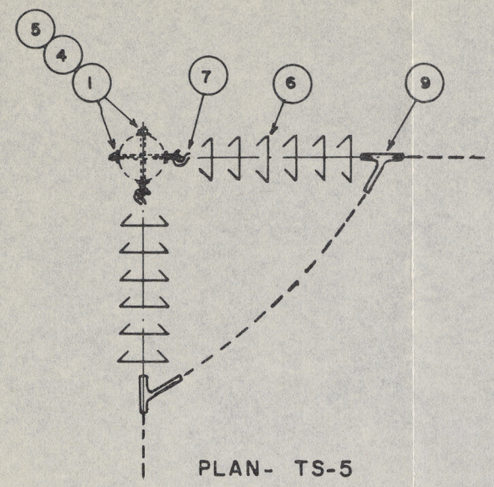
TS-3
MEDIUM ANGLE



TS-4
LARGE ANGLE



TS-5
50°-90° DEAD END



PLAN- TS-5

NOTE:
Make one turn of downlead underneath washers around conductor support bolts.

LIST OF MATERIAL

DR'G REF.	REQUIRED TS-3	TS-4	TS-5	DESCRIPTION	ITEM
1		3	6	3/4"x 14" Eye Bolt	o
2	6			3/4"x 14" Clevis Bolt	ef
3	3			3/4" Angle Bracket	cr
4	12	6	12	2 1/4"x 2 1/4"x 3/16" Galv. Sq. Washer, 13/16" Hole	d
5	6	3	6	Locknuts for 3/4" Bolt	ek
6	*	*	*	5 3/4"x 10" Suspension Insulator	k
7	3	3	6	Suspension Hook	eh
8	3	3		Suspension Clamp and Connecting Piece	ei
9			6	Dead End Clamp and Connecting Piece	ej

*As required, see Drg. TM-1

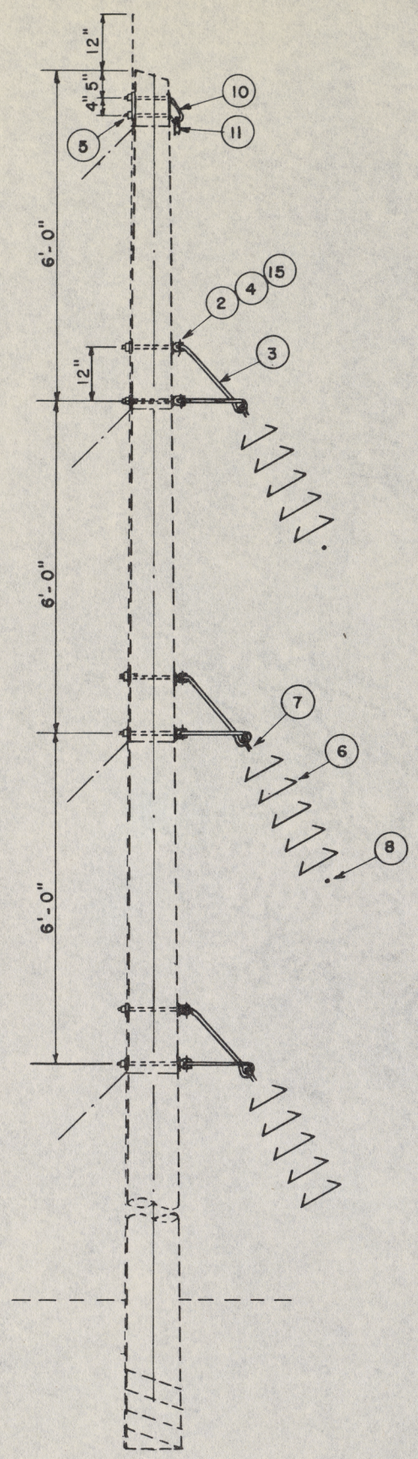
TRANSMISSION LINE VERTICAL STRUCTURES
_____ KV. SINGLE POLE SUSPENSION
(69 KV. MAXIMUM)

Scale: 3/8"=1'-0"

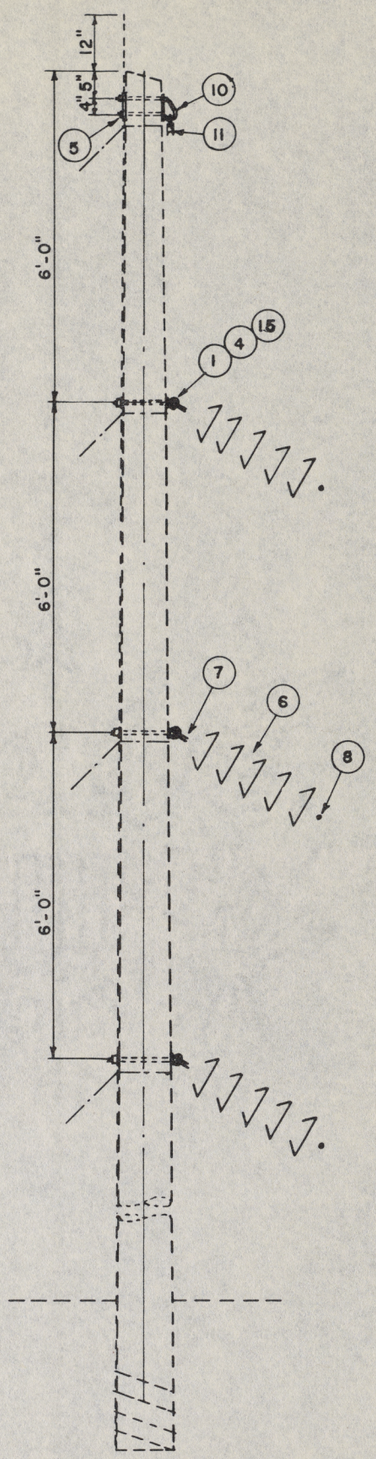
Date:

TS-3,4,5

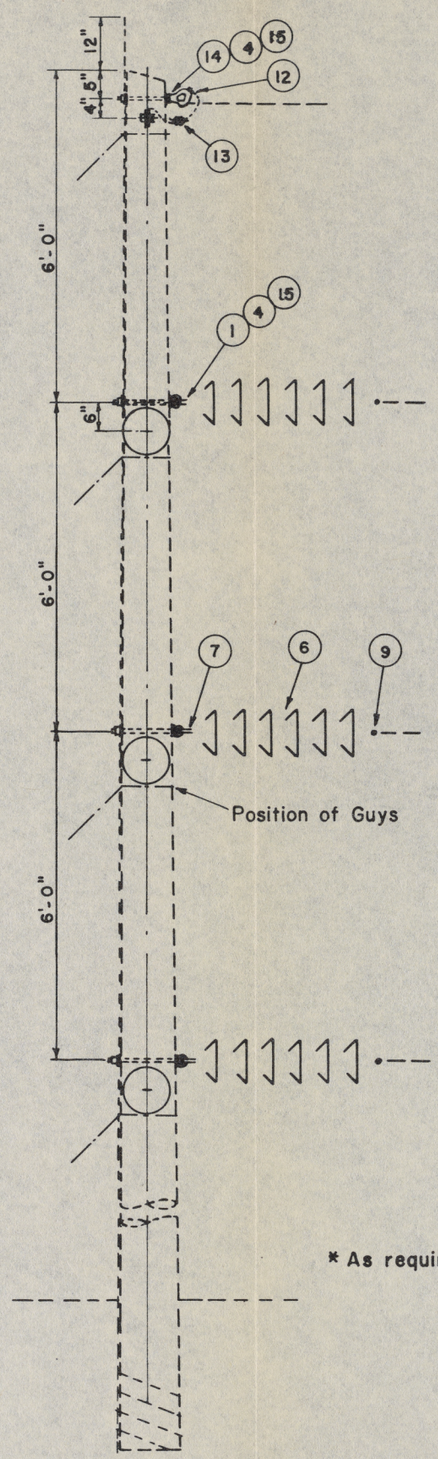
267825 O - 53 (Fol. TM - 23) No. 9



TS-3G
MEDIUM ANGLE

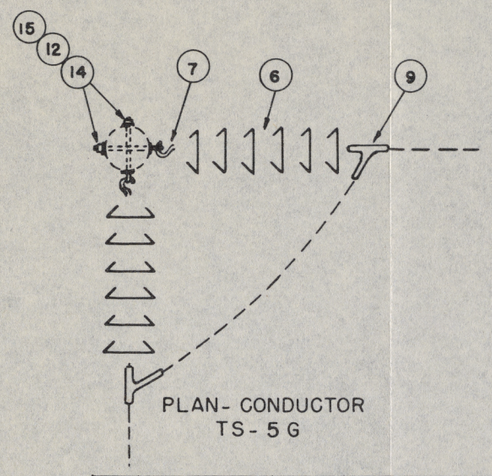


TS-4G
LARGE ANGLE

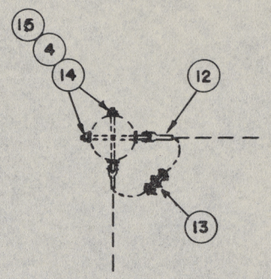


TS-5G
50°-90° DEAD END

NOTE:
Make one turn of downlead underneath washers around conductor support bolts and overhead ground wire support bolts.



PLAN- CONDUCTOR
TS-5G



PLAN- GROUND WIRE
TS-5G

LIST OF MATERIAL

DR'G. REF.	REQUIRED TS-3G	TS-4G	TS-5G	DESCRIPTION	ITEM
1		3	6	3/4"x14" Eye Bolt	o
2	6			3/4"x14" Clevis Bolt	ef
3	3			3/4" Angle Bracket	cr
4	12	6	16	2 1/4"x2 1/4"x 3/16" Galv. Sq. Washer, 13/16" Hole	d
5	2	2		Locknuts for 5/8" Bolt	ek
6	*	*	*	5 3/4"x10" Suspension Insulator	k
7	3	3	6	Suspension Hook	eh
8	3	3		Suspension Clamp and Connecting Piece	ei
9			6	Dead End Clamp and Connecting Piece	ej
10	1	1		Ground Wire Cable Support	ed
11	1	1		Ground Wire Suspension Clamp	m
12			2	Ground Wire Dead End Clamp	l
13			1	6"- 3 Bolt Clamp	u
14			2	3/4"x12" Eye Bolt	o
15	6	3	8	Locknuts for 3/4" Bolt	ek

* As required. See Drg. TM-1

TRANSMISSION LINE VERTICAL STRUCTURES

___KV. SINGLE POLE SUSPENSION-WITH OVERHEAD GR'D

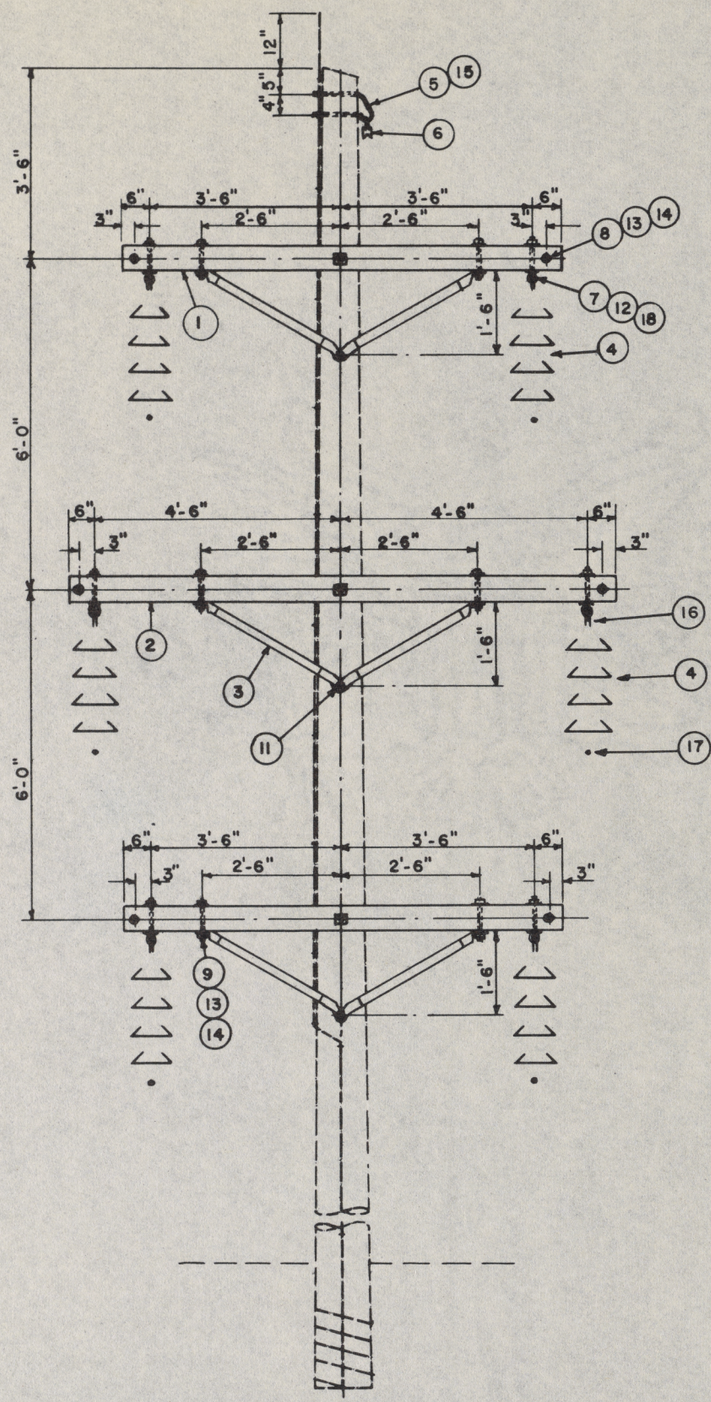
(69 KV. MAXIMUM)

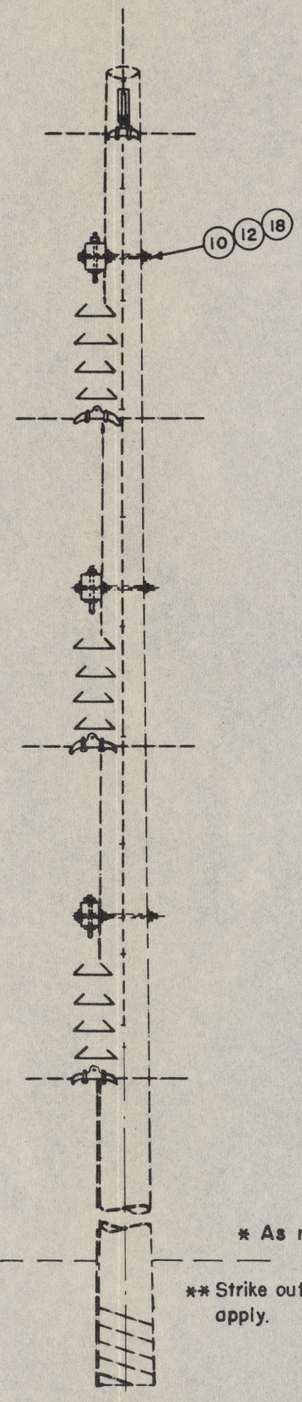
Scale: 3/8"=1'-0"

Date:

TS-3G,4G,5G

267825 O - 53 (Fol. TM - 23) No. 10





NOTE:

Make one turn of downlead underneath washer around overhead ground wire support bolts, and staple to pole so that it does not come in contact with crossarms or through bolts.

LIST OF MATERIAL			
DR'G. REF.	REQ'D	DESCRIPTION	ITEM
1	2	4 3/4"x 5 3/4"x 8'-0" Wood Crossarm	g
2	1	4 3/4"x5 3/4"x10'-0" Wood Crossarm	g
3	3	60" Wood Crossarm Brace	cu
4	*	5 3/4"x 10" Suspension Insulator	k
5	1	Ground Wire Cable Support	ed
6	1	Ground Wire Suspension Clamp	m
7	6	3/4"x 8" Eye Bolt	o
8	6	1/2"x 6" Machine Bolt	c
9	6	1/2"x 8" Machine Bolt	c
10	3	3/4"x 18" Machine Bolt	c
** 11	3	5/8"x 5" Lag Screw or 5/8"x 12" Mach. Bolt & Locknut	j
12	18	2 1/4"x 2 1/4"x 3/16" Galv. Sq. Washer, 13/16" Hole	d
13	18	1 3/8" Galv. Round Washer, 9/16" Hole	d
14	12	Locknuts for 1/2" Bolt	ek
15	2	Locknuts for 5/8" Bolt	ek
16	6	Suspension Hook	eh
17	6	Suspension Clamp and Connecting Piece	ei
18	9	Locknuts for 3/4" Bolt	ek

* As required. See Drg. TM-1

** Strike out item which does not apply.

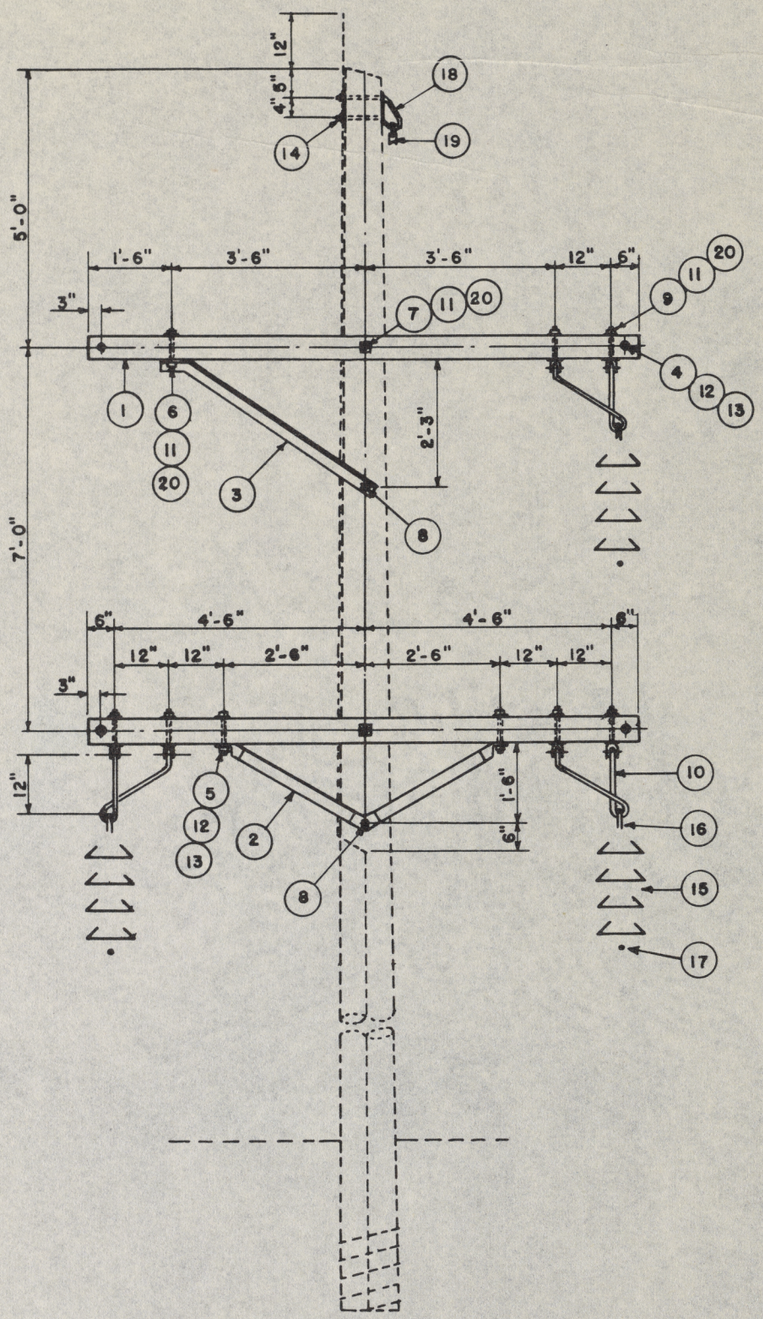
TRANSMISSION LINE TANGENT STRUCTURE

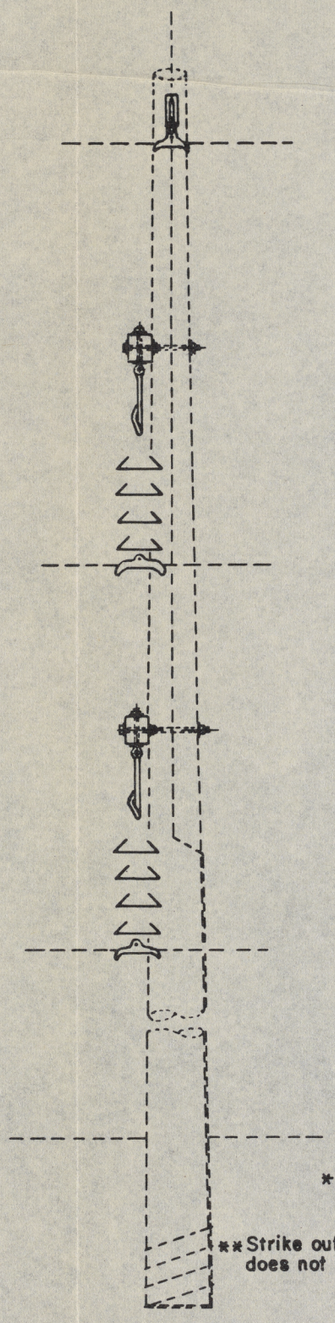
___ KV. SINGLE POLE SUSPENSION - DOUBLE CIRCUIT

(69 KV. MAXIMUM)

Scale: 3/8"=1'-0"		Date:
		TS-6

267825 O - 53 (Fol. TM - 23) No. 11





NOTE

Make one turn of downlead underneath washers around overhead ground wire support bolts and staple to pole so that it does not come in contact with crossarms or through bolts.

LIST OF MATERIAL

	DR'G. REF.	REQ'D	DESCRIPTION	ITEM
	1	2	4 3/4"x 5 3/4"x10'-0" Wood Crossarm	g
	2	1	60" Wood Crossarm Brace	cu
	3	1	Alley Arm Brace	em
	4	4	1/2"x 6" Machine Bolt	c
	5	2	1/2"x 8" Machine Bolt	c
	6	1	3/4"x 8" Machine Bolt	c
	7	2	3/4"x 18" Machine Bolt	c
**	8	2	5/8"x 5" Lag Screw or 5/8"x 12" Mach. Bolt & Locknut	j
	9	6	3/4"x 8" Clevis Bolt	ef
	10	3	3/4" Angle Bracket	cr
	11	17	2 1/4"x 2 1/4"x 3/16" Galv. Sq. Washer, 13/16" Hole	d
	12	10	1 3/8" Galv. Round Washer, 9/16" Hole	d
	13	6	Locknuts for 1/2" Bolt	ek
	14	2	Locknuts for 5/8" Bolt	ek
	15	*	5 3/4"x 10" Suspension Insulator	k
	16	3	Suspension Hook	eh
	17	3	Suspension Clamp and Connecting Piece	ei
	18	1	Overhead Ground Wire Cable Support	ed
	19	1	Ground Wire Suspension Clamp	m
	20	9	Locknuts for 3/4" Bolt	ek

* As required, see Drg. TM-1

** Strike out item which does not apply.

TRANSMISSION LINE TANGENT STRUCTURE

____KV. SINGLE POLE SUSPENSION- WITH BRACKETS

(69 KV. MAXIMUM)

Scale: 3/8"=1'-0"		Date:
		TS-7

267825 O - 53 (Fol. TM - 23) No. 12